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EMIL SCHEFFER.

By C. Lewis Diehl.

As near as I can now remember, I became acquainted with Emil Scheffer in the autumn of 1866—possibly in the spring of 1867. Some charitable or other popular entertainment was to be given, and part of the program consisted in certain chemical experiments which were to be exhibited by Prof. William Hailman, at that time at the head of the German-English Academy, who came to consult with me and to solicit my assistance. In the course of our conversation he mentioned that he had also been promised the co-operation of Emil Scheffer, and when I remarked that I had not yet met that gentleman, he expressed his surprise that I should have been a resident of Louisville for nearly two years without having become acquainted with a man so prominent in the profession of pharmacy and chemistry, and so kindly and lovable in disposition. I explained, that although well aware of the high professional reputation of Mr. Scheffer, he had been represented to me as being cold and unapproachable in his disposition, and that therefore I had not sought an opportunity to become acquainted; whereupon, assuring me that Scheffer had been misrepresented to me, and with evident indignation at what he qualified as "base slander," he insisted that I should at once accompany him and become acquainted with a man whom he considered to be, and honored as one of nature's noblemen. Accordingly I met Emil Scheffer on that to me memorable day for the first time, and I may say that from that day to the Sunday immediately preceding his death, which occurred on January

22d of this year, scarcely a week passed—unless prevented by absence from the city—during which we failed to meet in friendly intercourse and conversation, in the course of which I soon gained an insight into a mind as beautiful and simple as it was lofty and generous. An intimate friendship was thus cemented, and we confided to each other much that is ordinarily revealed only to those connected by ties of blood. It is, therefore, to me a welcome task as well as a sad duty when I respond to the request of the editor of the AMERICAN JOURNAL OF PHARMACY to write a sketch of the life and career of my departed friend and colleague, in which I propose to give such details as have come to my personal knowledge, and that may be published with the sanction of the bereaved family.

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Emil Scheffer was the youngest of the seven children—three sons and four daughters—that blessed the union of Carl Ludwig Frederick Scheffer and Marie Maurer. He was born at Stuttgart, the capital city of Wurtemberg, on July 7, 1821, but it was not allotted him to experience the loving care of a father, who died when Emil was scarcely two-and-one-half years old, during the month of December, 1823, in the prime of life, being barely forty-four years of age. With but a slender fortune remaining for her maintenance, one may well conceive of the straits the widow encountered in providing for and educating her seven children after the death of her husband. Fortunately, the education of the elder children, notably of the daughters, had been well advanced; they had become proficient in the arts of drawing and painting, and of fine needlework, which now served them a good turn, so that, when in 1848 the good mother also closed her eyes in eternal sleep, they were able to eke out a comfortable existence as teachers of their respective arts and accomplishments—in fact, were so engaged until in their advanced age they were able to retire comfortably from active occupation. It was under conditions of adversity, then, that Emil Scheffer grew to manhood, but under the beneficent influence and loving care of a good mother and affectionate sisters. Of these he always spoke with touching tenderness, and when, at ages approaching and exceeding ninety years, all but one of the sisters were claimed by the Great Reaper, he mourned them as sincerely as though they had been his daily companions. His

school-days began at the early age of five years—at first in Stuttgart until 1829, then at Boeblingen until the spring of 1835, when he returned to Stuttgart, entering upon a brief course at the Polytechnical School. In the autumn of the same year, however, it was found expedient to select a vocation for him. His studious habits and inclination fitting him admirably for the profession of pharmacy, he was apprenticed to an apothecary in the renowned university town of Tuebingen where, under the most favorable conditions, he laid the foundation for the varied and vast fund of knowledge upon which depended the distinguished reputation he enjoyed in after years.

Although we know Scheffer mainly as an accomplished chemist, his favorite pursuit, as he frequently assured me, was that of botany; and while not neglecting, as we may readily understand, the study of pharmacy, of chemistry, and of the physical sciences, pharmacognosy and botany were to him the most attractive. He loved to speak of the numerous excursions he made into the fields and forests of his native Suabia, devoting his leisure hours to studying the rich and varied flora of his immediate surroundings, and extending his botanical excursions during his annual vacations as far as the beautiful "Schwartzwald" and even to the magnificent Suabian Alps.

Having completed his term of apprenticeship in 1840, and passed a highly creditable examination, Scheffer secured a position in Constance, where he remained two years, then in Zurich until 1844, and afterwards for short periods in Frankfort-on-the-Main and in Mannheim-on-the-Rhine. Returning to Stuttgart in the spring of 1845, he again attended the Polytechnicum, preparatory to his finishing course at the University of Tuebingen, beginning in the autumn of the same year. Here he had opportunity to listen to and absorb the lectures of some of the most eminent German professors, among them the celebrated Gmelin, author of "Gmelin's Chemistry," whose assistant he became and with whom he remained after passing his "State examination" until shortly before his departure for America, in the spring of 1849.

The years 1848–49, it will be remembered, were years of turmoil throughout the continent of Europe. The revolution in France, which resulted in the dethronement of Louis Phillip, spread to Austria and the German States in general, and for a brief period

these were completely revolutionized. The reaction came, however, early in 1849, and Scheffer, who in common with the liberal intellects of his country had espoused the revolutionary cause, found his prospects for future advancement jeopardized to such a degree that he resolved to try his fortune in the United States, as so many of his friends were then about to do or had done before him—this step having become less regrettable because the ties that bound him to his native land had been loosened by the death of his mother.

Leaving the port of Havre, May 30, 1849, Scheffer arrived in New York after a pleasant voyage of thirty days; but finding no congenial position he continued his journey westward, arriving in Cincinnati early during the month of July, where he soon entered the employ of the late Charles Schmidt, at that period one of the most popular German pharmacists of that city. It is needless to say that he was soon recognized to be a pharmacist of more than ordinary accomplishments, his reputation becoming so widespread that when in the autumn of 1850 the widow of Frederick William Kniess, of Louisville, needed a manager for the drug store left on her hands, her friends advised her to secure his services for that position. Accepting, he entered upon his duties on November 10, 1850, and soon succeeded in developing and expanding the business so satisfactorily that the owner admitted him to a full partnership, the compact being sealed by the gift of her hand and heart on January 20, 1852. This union with Olivia Kniess, née Beckham, was blessed during the happy years that followed with the advent of six children—three sons and three daughters—Emil, August and Edward, Minnie, Olivia and Ida; of these, five survive their parents, the second son, Dr. August Scheffer, being taken away in the bloom of early manhood, March 8, 1890, following his mother, whose death occurred in the month of August, 1889.

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Scheffer's drug store was located on the north side of Market street, between Floyd and Preston. In its appointments it was as simple and unpretentious as was its owner, but it was a store that, in contrast to most modern stores, would bear close inspection. Cleanliness and order, thorough and systematic, prevailed throughout. In the old-time shop bottles, the contents, as nearly conformable to the standard as could be demanded, were protected by caps constructed during hours of leisure from card-board and silver paper;

the drawers were a pattern of orderliness both as to contents and condition; the prescription-counter, flanked on the side by a costly and accurate analytical balance, was spacious and appointed with every convenience that might facilitate and expedite the compounding and delivery of medicines. A good, well-ventilated cellar, the pink of orderliness and cleanliness, served for the storage of perishable goods, while the stock of herbs, roots and barks was stored in a dry and lofty apartment over the store. To the immediate rear of the store was the laboratory, leading into a storeroom for the excess of unperishable stock; and in a separate building, in the rear of all, was located a supplemental laboratory for processes of fusion, calcinations and operations evolving noxious or corrosive gases. These laboratories were not only well appointed in all respects for the preparation of galenicals and chemicals—organic as well as inorganic—but they were in daily use. And yet, when one approached the house, there was little to distinguish it from its equally humble neighbors, except, indeed, the cleanliness of the glass in the three double doors composing the front of the store.

Equipped as explained, what wonder that Scheffer should have drawn his patrons from all parts of the city and from all classes. For many years he enjoyed the patronage of the wealthiest as well as of the humblest, and he secured and maintained the confidence and respect of the foremost physicians of his adopted home, who consulted him freely, and for whom he prepared many preparations and chemicals that, although now as common as cream of tartar or quinine, were during the third quarter of the past century unobtainable or rarely found in the drug market. His general knowledge of technical operations also served to increase his popularity, for he was daily consulted by dyers, tanners, artificers and manufacturers in different lines requiring advice on chemical processes—all of which was given freely and gratuitously. Moreover, the completeness and variety of his stock, and his comprehensive knowledge, enabled him to supply his brother pharmacists with many medicaments and preparations that were not profitably—or for other reasons—stocked by them, and he was quite as frequently consulted by them on questions with which they were unfamiliar. Implicit reliance was placed by the latter in all that came from Scheffer's drug store, a fact which was plainly demonstrated when, in 1882, he closed his drug business definitely. Conditions had undergone

a revolution during the thirty-two years of his incumbency; preparations which, in the early years of his career were made by the pharmacists, were now supplied by manufacturers; the older remedial agents gave way to new ones introduced; and, to cap it all, the city had grown, so to speak, away from him, leaving but a corporal's guard of his former patrons. Under these circumstances he could not hope to get an adequate offer for his store as a whole, and he accordingly resolved to sell out in detail. Ordinarily, this would mean to sell at a sacrifice; but when the sale was completed, he assured me that he had realized on all of his stock—offering only that which was of merchantable quality—a fair wholesale price, the stock and store-appurtenances being mainly purchased by the retail pharmacists of the city.

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Up to the year 1870, our knowledge of the proteolytic ferments was very imperfect, and with the exception of the impure products, called "pepsin," none of these ferments were employed in medicine. These pepsins were without exception produced from the inner coating of the stomach of herbivorous animals, the American products from beef stomachs, the French pepsin from the stomach of the sheep—the latter being the kind of pepsin employed almost exclusively by American practitioners. Pepsin being administered for the purpose of restoring the impaired digestive functions of man, it occurred to Scheffer, when entrusted by one of his medical friends with the problem of preparing it in a liquid form, that the stomach of an omnivorous animal—that of the pig, for instance—would yield a preparation more closely representing the digestive principle in the stomach of omnivorous man than would a similar preparation made from the stomachs of herbivors. This course of reasoning led him to select the mucous membrane of the pig's stomach as the basis of his "liquid pepsin," his formula for its preparation being published by him to the world so soon as it had been determined to his satisfaction that this liquid possessed the expected activity.

But Scheffer was not the man to rest satisfied with this achievement. He realized that the crude methods recommended by the French authorities for preparing "dry pepsin"—scraping off the mucous membrane from sheep's stomachs, extraction with water, clarification with lead acetate, removal of excess of lead salt by

sulph-hydric acid, concentration by the aid of moderate temperature, etc.—involved so many possibilities of change, that a process of isolation and purification by the aid of less energetic agents was a desideratum. He remembered that his old professor, Gmelin, had pointed out during his lectures the facility with which albumen and allied bodies are thrown out of aqueous solution by common salt, and I remember well the exultation with which he demonstrated to me the fact that when a solution of pepsin is mixed with sufficient brine, a frothy scum gradually develops and rises to the surface, which scum on closer inspection proves to be composed of minute globules, and that these globules, when redissolved in water by the aid of a little hydrochloric acid, possess the digestive qualities of the original pepsin solution unimpaired. It remained only to find suitable methods of separating the pure pepsin and to reduce it to a dry condition and permanently active form. As is now well known, this is a very simple process, but it was not so simple a matter to achieve it initially, so that it was not until 1872 that Scheffer was able to communicate a process which has made his name famous throughout the civilized world. Briefly stated, this process consists in collecting the pepsin globules on straining cloths, expression under a powerful press, washing the press-cake with a little water to remove salt as much as possible, then triturating it in a mortar with milk-sugar so as to form a damp powder, which is completely dried in a current of air at the ordinary temperature and reduced to a fine powder. This is finally adjusted by the further addition of milk-sugar to such a strength that a stated quantity will effect the solution of a stated quantity of freshly coagulated egg-white in a definite quantity of acidulated water within a given period of time.

In revealing his process for the manufacture of "saccharated pepsin" to the world, Scheffer has undoubtedly given the incentive to the more intelligent and comprehensive study of the proteolytic ferments, and these, in their turn, have encouraged the investigation and study of biological products in general. It is unquestionable, that with the advent of "Scheffer's pepsin" the use of pepsin in the practice of medicine secured a fast and permanent foothold, and it need not be told that hundreds of individuals have made a competence by the manufacture of pepsin, or of its preparations—though none have been so generous, as was Scheffer, to make their methods

common property. During the years of his experiments on pepsin he freely spoke with me both regarding the difficulties encountered and of his intention in the event of success. He never for a moment considered the propriety of withholding his process from the public; and while my own views on this subject were in perfect accord with his, I do not think that he would have adopted a different course if he had never met me at all. To give a further insight into the lofty character of the man, I need perhaps only mention that after definitely relinquishing the manufacture of pepsin—which had drifted into the hands of the "pepton-pepsin" manufacturer—he absolutely declined to accept a highly lucrative offer made to him by a most responsible firm for the right to manufacture pepsin under his name. When speaking of this to me, he explained that he did not wish his name coupled with a product which, in all probability, would eventually be "pepton-pepsin"—however honest the present intention of the applicant might be: that "pepton-pepsin" was more popular, because more easily prepared and *apparently* more powerful. Its absolute superiority as a digestive agent over his precipitated pepsin he denied emphatically, and he died under the conviction that "absolute pepsin" can only be prepared by his own process, or by one essentially conforming to it.

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Naturally of a modest and retiring disposition, Scheffer's intercourse with his fellow pharmacists was chiefly limited to the courteous expedition of the demands made on him, and it was probably due to this natural reserve that he was, from some quarters at least, misrepresented as being cold and unapproachable. But his intimates knew better; they valued him for his congenial and sympathetic disposition, the earnestness and sincerity of his character, and his loyalty to his friends; and these qualities manifested themselves eventually to the less intimate of his acquaintances, when, at the close of the sixties, the Louisville College of Pharmacy was called into existence. He had, in common with some of his professional friends, long deplored the absence of organization among his fellow pharmacists, and therefore entered with heart and soul into the scheme of organizing and maintaining a college and school of pharmacy; becoming one of its founders, and serving it as one of its directors and professors, as treasurer and as president, during a period covering more than a score of years: director, continuously

from its organization in 1866 until 1889; president, from 1884 to 1888; treasurer during the year 1888–1889, and Professor of Materia Medica and Botany, continuously from 1871 until the end of the school session of 1883–1884. Burdened with the cares of an active business, his time largely occupied with analytical and other professional work, he yet found the time to attend to the arduous duties involved in these offices, and to attend to them thoroughly. However, this is history that can be more satisfactorily told in an historical sketch of the college, which the present memorial is not intended to be. Suffice it to say, that he saw the college grow from its weakly beginning to sturdy independence and usefulness, and that no one member of the college contributed so much time, intellect and substance towards paving the way to its final success as did Emil Scheffer.

In 1872 Scheffer joined the American Pharmaceutical Association, whose annual meetings he frequently attended, and whose proceedings he followed with lively interest, until, with advancing years, having relinquished his active business pursuits, he reluctantly severed his connection. He became a member of the Committee of Revision of the Pharmacopœia of the United States in 1880, being selected to fill the vacancy caused by the resignation of the late Dr. Edward R. Squibb, whose place he filled creditably for the remainder of the term, ending with the Convention of 1890. He likewise served his adopted State as one of its first Commissioners of Pharmacy, from 1874, when a law regulating the practice of pharmacy within the jurisdiction of Kentucky was placed upon its statutes, until 1882, and it goes without saying that he fulfilled his trust with absolute fidelity and to the advantage of the commonwealth.

What Scheffer was to his family cannot be discussed without invading the sanctity of his home-life. It is sufficient for us to know that he is mourned by his children and grandchildren as only a good and affectionate parent can be mourned. And he was all that, as well as a good husband, brother and friend. He was also a good citizen; and though he returned to the land of his childhood and early manhood on five different occasions, always accompanied by one or more members of his family, he did so because of his affectionate regard for his old sisters and brothers, and not because of disloyalty—even in thought—to the land of his adoption.

Louisville, Ky., April, 1902.

SPOONFUL DOSES.

A DEFINITION FOR, AND THEIR EQUIVALENTS.

By M. I. Wilbert,
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The subject of doses and their administration would strike one as being of more importance than the amount of thought that has been expended on it would appear to indicate.

Volumes have been written on the standardization of drugs and their preparations, while little or no attention has been paid to how these standardized drugs and preparations are administered to the patient whose ills and affections they are intended to cure or relieve.

In a paper published in the March number of the American Journal of Pharmacy the writer called attention to the difference that existed in the capacity of the various medicine measures that are in use at the present time. In the same paper attention was also directed to the variation that may be occasioned by the personal equation of the nurse, or the person doing the measuring.

That there should be at least a semblance of accuracy in the administration of liquid medicines will readily be admitted by all who have ever given the subject a reasonable amount of thought. This is the more apparent when we remember that there are, under the most favorable conditions, so many factors that may modify or change the effect that certain substances are likely to have on the animal organism, either in health or disease, that the matter of knowing, approximately at least, what amount of a certain drug has brought about a particular change or result is not only of interest, but may be of vital importance, as it is only by analogy, or the careful study of the effects of corresponding doses on various individuals, that we are able to make any scientific progress in the rational application and use of medicinal substances.

Another interesting possibility is the fact that occasionally startling and sometimes serious effects are caused by drugs under certain conditions. Here again we see how important it may be, not only for the physician, and the patient directly interested, but also for others, to know exactly how much or how little of a drug has caused these unlooked-for or secondary effects. In this connection it should be remembered that instead of the patient having an idiosyncrasy or an abnormal toleration for a certain drug, it is always

quite possible that he has been given either more or less than the intended quantity, and, as a result of this, has either not responded, or has responded in a way that was unexpected and startling. So that, if for no other reason than the scientific study of the incidental or unexpected effects of drugs, it would appear desirable that any abnormal variation from the intended quantity or dose should be guarded against and prevented, if possible.

The reason why well-made liquid preparations are generally conceded to be more efficient, and consequently more desirable, than a corresponding amount of a dry drug or a solid extract, is found in the physiological necessity, that materials to be absorbed by the stomach or intestinal canal must be in a fluid or a semifluid state; and while it is true that under ordinary circumstances the stomach has the property of dissolving many otherwise refractory substances, it must also be remembered that in case of illness or disease, the whole gastro-intestinal tract is necessarily less active, and in many cases is debilitated to such an extent that it will not absorb or assimilate the plainest food, and certainly would not be in any condition to dissolve and absorb medicinal ingredients contained in a hard pill or bolus mixed up with a large amount of inert or perhaps irritating powder.

The advantages of liquid preparations and their quality being acknowledged, it remains for us to inquire into the practicability of adjusting or improving the methods of measuring out and administering them. Modern practices appear to demand that liquid preparations be not only elegant in appearance, pleasant to the taste and smell, but also concentrated to a degree that will allow a number of doses being carried about in a vial no larger than would be needed to contain a single dose of an old-time tea or infusion.

By apparent, general consent, rather than by any carefully studied-out plan, doses have been adjusted to correspond, more or less closely, with the capacities of various household utensils, while from these in turn we have derived distinctive names for the various quantities, as teacupful, wineglassful, tablespoonful or teaspoonful doses.

Our object in this particular paper is to call attention again to the desirability of recognizing the importance of correctly measuring these smaller doses, the evident reason, of course, being that mixtures that are to be given in tea or tablespoonful quantities are

necessarily more potent than those given in larger amounts. This would indicate, of course, that the dose measures used should facilitate, if possible, the accurate division of the mixture into the required number of doses.

Spoons have been in use as medicine measures for such an extended period of time, and have established themselves so firmly in popular practice, that there are many people who would not think of using any other variety or kind of medicine measure.

It may also be of interest to note that in many households a particular spoon is sometimes set aside as the medicine spoon; this is usually of sterling silver, and the continued use of such a spoon will sometimes develop associations and reminiscences that are likely to become highly prized or sacred.

But even apart from any personal preference for or liking of a particular spoon, these household utensils are so common and their use as measures for various culinary purposes so firmly established, that it will be well-nigh impossible to displace them entirely by any substitute or contrivance that we may possibly find to offer. One other interesting and probably very important reason why spoons are preferred by many for measuring liquids, is the fact that they are more readily cleaned than are ordinary medicine glasses. This, while it appears to be but a trifling matter, nevertheless is one of considerable importance.

This line of thought would naturally recall the oft-repeated assertion that spoons are extremely variable in size and capacity. Inquiry among a number of jewelers, silversmiths, and manufacturers of spoons elicited the opinions that there had been little or no change in the actual capacity of the various spoons, and while they do vary in style or shape of bowl, the actual capacity of the bowl varies very little. As was pointed out to the writer, a wide or round bowl is usually quite shallow, while a narrow-pointed spoon is generally quite deep.

These opinions were later confirmed by a number of additional measurements that were made of various makes and sizes of spoons. The results of these measurements correspond very closely with those given in the table on dose measures quoted above. These investigations also appear to confirm the suggested fact that in actual practice there is less variation in the capacity of spoons than in the glass medicine measures that are usually recommended, and

that the supposed variation is largely, if not entirely due to the difference in the quantity that may be heaped on a spoon of a certain shape. It will readily be seen that a wide shallow spoon will hold more above the rim than one that is narrow and deep, though the actual capacity of the bowl may not differ materially.

The writer, however, does not want to put himself on record as advising the use of spoons in preference to an accurately graduated medicine measure. It is no doubt possible to construct a graduated measure that will not only facilitate the accurate measuring out of the desired dose, but which at the same time may be used to dilute and to administer such doses to the patient. This desirable combination, however, is not available at the present time.

With a view of bringing this question of doses and dose measures to the attention of physicians and pharmacists, a limited number of circular letters were sent out, asking for opinions on two different subjects—the first being in reference to the advisability of promulgating a definition for the term "spoonful," and in the event of this being acceptable, whether or not the definition as given in the French Codex would appear to cover the necessary points. This definition reads as follows: "A spoon is full when the liquid it contains comes up to but does not show a curve above the upper edge or rim of the bowl."

The second question was in connection with the gradual, but nevertheless steady increase in the number of physicians using the metric system of weights and measures in their prescription writing. At the present time there is no generally accepted equivalent for what is intended when the dose is indicated in a metric quantity, nor on the other hand, is there any accepted or generally understood quantity implied by the term teaspoonful, for instance, so that the conscientious pharmacist has no definite basis for estimating or controlling the dose of any active ingredients that may have been called for by the prescriber.

Briefly, the questions were as follows: Should we advise the adoption and use of 4, 8 and 16 c.c. as the approximate equivalents for the terms tea, dessert and tablespoonful respectively? They would correspond nearly to the present equivalents, namely, 1, 2 and 4 drams.

Should we use and advocate the equivalents as 5, 10 and 15 c.c. on account of their being decimal quantities and corresponding almost exactly to the actual capacities of spoons in actual use?

Or, as an alternative, should we adopt the French equivalents, as given by some authorities: these are 5, 10 and 20 c.c. and preserve the relations 1, 2, 4, as used in our present equivalents 1, 2 and 4 drams?

As might have been expected, the answers received show that there is considerable difference of opinion on the questions as stated. Let us take up, first, the question of promulgating a definition for the term spoonful.

Of the first sixty answers received, four were negative, six were evasive or non-committal, and fifty were in favor of a definition, and were satisfied with that given by the French Codex.

Of the four that objected to a definition, two objected to the use of spoons as medicine measures, and suggested, that in a matter so important as the administration of medicines should be, there would be no excuse for any one not being able to provide an accurately graduated medicine glass.

Two others objected to a definition, feeling that it would be of no advantage, as the personal equation of the individual doing the measuring could not be eliminated by any known means of instruction or demonstration.

As will be seen, by far the greater number of answers were in favor of a definition, as tending to greater accuracy, if for no other reason than calling the attention of the physician to the possible variation in the quantity that a spoon will hold when even, or when heaping full. This single possibility would appear to be of sufficient importance to warrant the adoption or promulgation of such a definition. For, as is urged, if once the physician's attention has been properly called to the possible variation in measured doses, he will, in important cases at least, call the attention of the nurse or patient to the necessity of exercising a certain amount of care in measuring out doses of active or important medicines.

In answer to the question on the most desirable equivalents for the various spoons in metric quantities, the replies were as follows:

Six suggested the use of 4, 8 and 16 c.c. as being in conformity with present practice and not necessitating the learning of a new set of equivalents or a new relation of these equivalents.

Thirty-six were in favor of the equivalents 5, 10 and 15 c.c. as being in keeping with a decimal system of notation, and also because these quantities correspond very nearly with the actual capacities of spoons available at the present time.

Eight for various reasons—chiefly for the sake of uniformity with the French—preferred the figures 5, 10 and 20. The argument that was advanced by several who were in favor of the latter equivalent was, that it would preserve the comparative relation of the equivalents for spoons as used at the present time, and that in addition it would correspond with the equivalents as used in France, so that if we should adopt the same in this country we would follow out the lines of adopting some universally used equivalents.

The available data at the writer's command does not allow him to make any definite statement as to the practices or equivalents that are used in the various European countries. As is well known, both in this country as well as in England, the equivalents for tea, dessert and tablespoon, are 1, 2 and 4 drams, respectively. In Germany, however, where the various galenical preparations are made entirely by weight, the prescriptions are also compounded in the same way. The resulting doses, however, are usually measured out in spoonful quantities, and the equivalents, according to which the apothecary is directed to estimate the maximum doses of active or poisonous drugs, are as follows:

Teaspoonful, from	3 to 5 grammes.
Children's spoonful, from	6 to 8 grammes.
Tablespoonful, from	10 to 15 grammes.

It will be noted that these equivalents do not at all correspond with those supposedly in use in France.

In reference to the latter country, both the United States Dispensatory and Dorvault's L'Officine give 5, 10 and 20 c.c. as the approximate equivalents for the various spoons.

The late Professor Maisch, in a table of equivalents published in the National Dispensatory, gives 5, 10 and 15 c.c. as the equivalents used in France for tea, dessert and tablespoonful. An attempt on the part of the writer to trace the origin of this particular table did not result very satisfactory. The sole surviving editor of the recent edition of that work, in answer to a letter of inquiry, stated that he was not acquainted with the source of the quotation but felt sure that it was verified, as its author was acknowledged to have been most careful and conscientious with all quotations.

The proposition to use 4, 8, and 16 c.c. as the metric equivalents for the various sizes of spoons can hardly be called a happy one, owing to the fact that square numbers do not fit in well with

decimals; and that if we wish to popularize the metric system in this country, we must simplify it so as to induce people to think in metric quantities, as it is practically impossible to think of quantities in one system of weights and measures and then transpose them into another with any appreciable amount of facility or satisfaction. For these reasons it would appear desirable to use equivalents that not only differ from those generally accepted but also fit in better with a decimal system of notation.

To sum up, then, the proofs and arguments that have been advanced would seem to indicate, that so long as doses of medicines are referred to as being spoonful quantities, spoons will be largely used as medicine measures. If spoons are used to measure out doses of active medicines, it would appear that we should, at least, make some effort to secure greater accuracy and uniformity in the quantities that are likely to be administered. For this purpose the adoption of a descriptive definition, indicating the approximate amount that is intended by the term spoonful, would appear to offer some possibility of securing the desired results.

As regards the proposed equivalents for tea, dessert, and tablespoonful it would appear to be desirable that we adopt quantities that will fit in well with the system of notation used in the metric system of weights and measures; and here again, if doses are to be referred to as being spoonful quantities, these quantities should conform as nearly as possible with the actual capacities of the spoons that they are supposed to represent.

CHAMOIS SKINS.

THEIR PREPARATION FOR THE MARKET AND THEIR COMMERCIAL VARIETIES.

By Charles C. Druding.

In presenting this article the writer will endeavor to place before you a plain, intelligible treatise on this subject, as he understands it from his experience of manufacture, or tanning rather, during an experience of about eighteen years.

The name chamois skin is rather a misnomer; it originates from the chamois animal, the zoological name being *Rupricapra Targus*. This animal inhabits the European Alps and Caucasian Mountains and resembles a goat or deer. These animals are very shy, and

hunters will follow them for days over dangerous mountain passes until they finally bring their prey at bay.

The animal is about the size of a goat or deer; of a dark chestnut-brown color, with the exception of the forehead, the sides of the lower joints and the muzzle, which are white. Its horns, rising above the eyes, are black, smooth and straight for two-thirds of their length, when they suddenly curve backward. Their hoofs are admirably adapted to avail themselves of little roughnesses or projections on the mountain sides, or icy glaciers. It has long, thick and coarse hair.

What is known in the market as chamois skin is really an oil-tanned sheep or lamb-skin lining. The supply of skins from the

Rupricapra Targus (Chamois).

chamois animal is very limited; enough could not be obtained in a year to supply the United States for more than a single day.

The writer made special inquiry on a recent visit to Switzerland about the annual crop of this class of skins. From all that he could learn, about five thousand to six thousand skins would be a fair average yearly crop.

The accompanying wood-cut is a good representation of the chamois animal. I will also submit a specimen of one of the skins of the chamois tanned in oil. This I know to be a genuine chamois skin.

This skin is heavier than the skin of the sheep or lamb, also

much coarser. For strength and durability this skin is preferable, but for ordinary use and appearance the oil-tanned sheep-skin lining would, in most instances, be preferred.

To manufacture sheep or lamb skins into chamois leather the first step necessary is to remove the wool, which is accomplished either by painting the skin on the inside with a solution of sodium sulphite or by immersion in milk of lime.

By the former method the wool is loosened in a few hours; by the latter method it will require several days.

When the wool is loose, it is pulled off either by hand or scraped off with a dull instrument.

The skin is now again immersed in milk of lime, to swell it. It is then cleaned (beamed, as the trade calls it), to remove all fleshy particles that may adhere to it.

It is now ready for splitting. I wish to explain here that a chamois skin is really only the half of a skin. The outside, that is, that part of the skin next to the wool, known as the grain side, is not suitable for chamois leather, and is used for other purposes, mostly for hat linings, book covers, etc.

In former times, when skins were prepared for oil tannage, this part of the skin was cut away with a suitable knife and thus lost.

In our days the skin is cut through the centre (split), thus producing two skins from one—the outside, called grain or skiver, and the inside, called lining or flesher.

The splitting is accomplished on machines specially constructed for this purpose. It consists of an endless knife, the edge of which is constantly grinding to keep it sharp, the skin being passed through rollers against the sharp edge of the knife. These machines require very delicate adjustment to produce good results.

The accompanying specimen split half-way through will illustrate this process; about one-half of the skin is still the whole skin, and the other half being divided into skiver and lining.

This specimen had to be dried so as to preserve it. It will also illustrate what a raw skin looks like.

The lining or flesher is now ready for tanning. This is accomplished by sprinkling it with oil, cod-fish oil of good quality. It is important that this oil should be thoroughly incorporated into the skin. For this purpose a quantity of the skins are placed into what are known as fulling stocks, which twist and turn the skins in every direction, and distribute the oil evenly.

After sufficient milling the skins are partly dried and the process of sprinkling, milling and drying is repeated again and again until they are full of oil, and all the moisture is dried out.

They are now allowed to hang sufficiently long to thoroughly tan them at a temperature of about 100°.

The process after this is very simple. The oil is removed by pressure and the balance washed out by saponification; after this they are dried and they are then ready for finishing.

The oil, by the way, is recovered, by decomposing the soap solution with an acid and separating.

It is sold to manufacturers of other leather, it being useful to make them pliable, etc.

The finishing is done mostly by pressing the skin against revolving wheels, covered with emery or flint to remove all adhering substances and to present a finely finished surface.

We now have the finished chamois leather ready for the trimming and sorting room, where it is cut into suitable sizes and packed for the market.

Of late years a trimmed skin, that is, skins of even sizes, are preferred by the trade. For this reason most manufacturers, at least most American manufacturers, cut their skins over patterns so as to produce uniform sizes.

In former years, when England and France supplied the United States market, the skins in the same package would vary in size and shape, thus lacking uniformity.

It is true by cutting uniform sizes there is necessarily some waste, but this is reduced to a minimum, when all small pieces are again utilized, by manufacturing them into watch pockets and other small articles which find a ready sale.

The principal uses for chamois skins are for cleaning purposes. They will absorb moisture readily and give a high polish to glass, furniture and other highly polished surfaces.

A good chamois can be used either wet or dry. Quantities are also used for chest protectors, chamois vests, and even underclothes are made out of them for cold climates, also in the manufacture of other leather goods, such as purses, etc. Ladies use them for fancy work.

They can be made in all colors; formerly colors were mostly produced by applying to the surface of the skin different colored

pigments, which adhere to the leather. This produces an unsatisfactory article, however, as it will always dust more or less.

Of late years, however, manufacturers have succeeded in producing fine colors with aniline, which are more satisfactory; some specimens of colored chamois are here shown.

By incorporating a small quantity of ferric oxide, very finely powdered, an excellent polishing chamois is produced for silverware, etc.

A good quality of chamois skin is generally of a yellow or light yellow color, which, when freshly cut, should show a dark yellow color. This is a characteristic test of oil tannage. The absence of this color is generally an indication that the skin is tanned by a different method.

A good quality of oil leather should also absorb moisture readily. This test is readily applied by dropping a few drops of water on the skin; it should absorb it readily. If these drops roll about on the skin without absorption, it is almost a sure indication that it is not oil tanned.

For some purposes a very light straw-colored chamois is demanded by the trade. These are produced by bleaching with sulphur. The skins, slightly damp, are hung in an air-tight room in which a small quantity of sulphur is burned, producing a light straw-colored product of bright color. It rather weakens the skin, however, and also incorporates some sulphur, which is objectionable when used in connection with silverware.

These bleached goods should not be used for wrapping silver, as they are apt to tarnish it by producing sulphide.

The market affords a number of different brands of chamois skins. The principal ones are the American goods, the English and the French goods.

The American goods of late years have largely crowded out the imported goods, and are even now getting quite a foothold in Europe. Large quantities are now being exported principally to Germany, where they find a ready market. The English goods are generally of good quality and tannage. They come in both colors, yellow and white, the latter color being produced by bleaching.

They are trimmed and sorted mostly in irregular shapes and sizes; the French goods mostly of a dark yellow color, in large sizes. One variety, Bruts, are heavy skins finished on one side

only. This is purposely done, so that they absorb large quantities of water, thus making them suitable for stable work, carriage washing, etc. Another variety of French goods is the double dressed. These also come in large sizes only. They are very similar to the Bruts, with the difference that they are finished on both sides, making them thin like ordinary goods.

Another variety produced by American makers is what is known as steel-colored goods. These are not oil tanned goods. They are chrome leather, produced by tanning with chrome. This produces a bluish-gray-colored leather. They are very strong, and for this reason will bear more abuse than the oil-tanned goods. They may be washed with nearly boiling water without much danger of injuring them. These are preferred by some for this reason. Some are also sold on account of color for fancy work, etc.

Most manufacturers sort these skins into three qualities—first quality, second quality, and third quality, and prices are regulated accordingly. The first quality should be almost free from stitches, soft and nearly perfect. The second quality are rejects from the firsts on account of too much stitching, harsh spots and other imperfections.

The third quality are again rejects from the second quality.

The drug trade, for the sake of retaining the public opinion that only the best quality of everything is obtainable in a drug store, should handle only the first quality of goods.

Chamois skins are largely sold by the drug trade. Spring and fall are the best seasons to display them in the stores. A very attractive window display can be made with these goods.

Care should be taken, however, when used for this purpose, not to expose to sunlight, as this will very quickly bleach them, and thus render them unsightly. This does not deteriorate the quality in any other way, however.

A glass case filled with the goods, placed so that they can be seen, will keep them clean, and help to remind a woman when she enters the store that a chamois is needed in her household, and will assist materially to help sell the goods. Some druggists will keep them hidden in boxes or drawers, and produce them only when called for, with the inevitable result that their sales will be very limited.

A good quality chamois skin if properly used should last a long

time, and they can, of course, be used wet as well as dry. It is important that it is kept clean. If it is soiled, the best method of cleaning is by washing with soap and water. A liberal supply of soap is always beneficial to the skin.

The best method to prevent shrinking is to rinse it in soap suds before drying. When dry, rubbing and stretching will return it to its former softness.

Chamois skins are often abused through ignorance or inexperience. The writer has seen skins that were returned to the seller, who in turn returned them to the manufacturer, that were partly burned into charcoal, evidently caused by drying in strong heat, likely in a hot oven, others shrunk to one-fourth their natural size by being boiled or steeped in hot water.

It should be remembered that a chamois is gelatinous animal substance, a sort of oleate of gelatine, and too much heat should be avoided.

NOTES ON SPECIFIC GRAVITY.

By Thomas S. Wiegand.

The paper of Dr. Hatcher, in a recent number of the American Journal of Pharmacy, has called my attention to the subject of "Specific Gravity," and as the importance of a clear understanding of the subject is of such great advantage to the pharmacist, I feel no further apology is necessary for calling attention of members to the matter. Dr. Squibb, at the meeting of the American Pharmaceutical Association held in Chicago, in 1869, in a report on the Pharmacopœia, shows how valuable accurate determinations of specific gravity are in determining the quality of many of the preparations of the Pharmacopœia, and gives a discription of an improved specific-gravity bottle, by which the most common errors in ascertaining specific gravity of liquids can be reduced to a minimum; but it must be borne in mind that all the ordinary weighings are approximate only unless the *absolute weight* of the bottle is taken, for all the usual weighings are made in the air and not in vacuo, and the bottle which contains one litre of water will hold 17·7 grains of air and, of course, there is this much less weight to be used as a counterpoise when the bottle is being used in taking the specific gravity of any liquid; then the temperature at which the

liquid is weighed must be taken into account, and this correction must be made for each and every liquid experimented with, as each liquid has its own rate of expansion, and this rate of expansion must be ascertained and the scale for it arranged beforehand.

The paper of Dr. Hatcher's recalls the fact that that method of taking specific gravity was shown by me to the class when I was a quiz master to the Zeta Phi Society, 1875 or '77.

An easy method of taking specific gravity of bodies soluble in water is given in "Ganot's Physics," and is as follows: Weigh the body in air, then in some liquid the specific gravity of which has been ascertained, and in which it is insoluble, and multiply its weight by the specific gravity of the liquid, then divide this product by the loss sustained when immersed in the liquid. The result is the specific gravity sought.

A COMPARATIVE STUDY OF ATOMIC WEIGHT TABLES.

By M. I. Wilbert.

That the active pharmacist is interested in the present controversy on atomic weights is admitted; to what extent it might or will affect him in the ordinary routine of his business has probably not been considered.

Those of us who studied chemistry when hydrogen was 1 and oxygen always 16, do not perhaps realize the difficulties that beset the student and teacher of chemistry at the present day, when the atomic weights of the various elements vary with the text-book that is used or the table that is consulted. A great amount of work has been done in this connection in the last twenty years, and the leading chemists of the world have long ago refused to be bound by arbitrarily proposed laws; and among other things have discovered that our system of enumeration, for instance, is not necessarily a factor in chemical relations, so that instead of the various elements being related to each other in some mathematical proportion, we find that these proportions are at times fragmentary or fractional to a degree that is not at all in keeping with the average pharmacist's capacity in mental arithmetic.

But there is, no doubt, something more startling and revolutionary at the bottom of it all. There are so many physical phenomena to explain that we constantly hear of the possibility of our long-

cherished hypothesis of the atom being an entirely erroneous one, and that we will wake up some morning to a double-headed leader in the morning papers announcing the discovery, or perhaps the actual demonstration of the unity of matter and the possible transmutation of the various elementary bodies.

But what to do in the meantime is the question that is troubling many an able scientist. If we glance over the accompanying list of the elements and their corresponding atomic weights, we will realize that there is very little or no uniformity between them; and, what is more, every one will admit, that if we should use any one of these tables, the results of our computation or work would not agree with the results obtained by some one who was using one of the other tables.

But, first, a few words as to the origin of these tables. The first one is from Professor Ostwald's new book on "Anorganische Chemie," and, with the single exception of hydrogen, gives the same figures as the table of atomic weights in the German Pharmacopœia.

The latter book rounds out the figures for hydrogen at the second decimal, making it 1·01 instead of 1·008.

The second list, hydrogen–1, is from Professor Clark's table of comparative atomic weights (1900). It will be noted that these two tables do not exactly correspond in their relative figures, nor do they agree in all particulars with the tables published by the German Chemical Society. This particular H–1 table was chosen because it has been used in several text-books on chemistry that are now in use in this country.

The third table is taken from the Pharmacopœia of the United States for 1890.

The fourth list is from the atomic weights as given in the same standard for 1880.

In explanation we might say that niobium is duplicated under columbium, and the revised weights for didymium are given under neo and praseodidymium; these are matters of detail, however, and are of but secondary importance.

The important feature in connection with a comparative study of a table of this kind is a comparison of the atomic weights of the more common and, consequently, more important elements. If, for instance, we take into consideration the immense amount of work that has been done in the field of organic chemistry, confined almost

exclusively to oxygen, hydrogen, nitrogen and carbon, and compare the atomic weights as used at the present time, or those used twenty years ago, we will find that they differ but little from those given in the O-16 column. Or, if we confine ourselves to what is directly of interest to the working pharmacist, and admit that a large amount of the available chemical work has been done on the basis of the atomic weights as given in the Pharmacopœia for 1880, and then compare such common and important elements as carbon, oxygen, nitrogen, bromine, chlorine, iodine phosphorus, sulphur, potassium, sodium, calcium, magnesium, iron, lead, mercury and arsenic we will find that the weights given in the list for 1880 correspond very closely with those given in the O-16 column. This is true of all the elements enumerated above, with the single exception of magnesium, the atomic weight of which has been recalculated within the past twenty years.

But what is perhaps even more astonishing to the ordinary individual is that the atomic weights given in the Pharmacopœia of 1890 on the basis of H-1 correspond more closely to those of the O-16 series than they do to the revised H-1 tables. This is, of course, due to the fact that Morley, in 1898, showed that the proper relation of oxygen and hydrogen is as 1 to 15·875 instead of 1 to 15·96 as suggested by Lothar Meyer.

But there are still other reasons why we should, from a practical point of view, adopt O-16, and retain approximately the same molecular weights that have been used for upwards of thirty years. Among these are the facts that both the German and Swedish Pharmacopœias have already adopted the O-16 standard, and that if we should vary as much as we necessarily would, by retaining the H-1 standard, all of the new work done in these countries would not be available for us without elaborate recalculation.

Another interesting factor is found in the fact that the total decimals of all of the elements given in the table of atomic weights as published in the German Pharmacopœia is 33, while the corresponding elements in our own Pharmacopœia, or in the H-1 column, have 43, a difference of more than thirty per cent. To the ordinary mortal a saving of one-third in the necessary amount of extra calculation would appeal as being a matter of considerable moment.

After all, would it perhaps not be better to admit that chemistry is, as yet, not an exact science, but an experimental one, in which

there is material enough for all to do good work, without the constant changes that will be necessary if we insist on adhering to a standard of comparison that appears tobe but poorly adapted for the purpose?

If we admit that these weights are relative rather than absolute, would it not be just as well to use O-16 or C-12 or even Hg-200, as our standard of comparison, so long as we retain approximately, within insignificant fractions, the atomic weight figures with which so much of the practical work in chemistry has been done? To the writer's mind, a policy of this kind would not only simplify the routine work of the pharmaceutical, technical or analytical chemist, it would also facilitate original work, and might contribute materially to promote the advent of that much-to-be-desired positive knowledge of the constitution and properties of matter.

		Symbol	O = 16	H = 1	U.S.P. 1890	U.S.P. 1880
	Aluminum	Al	27·1	26·9	27·04	27·
	Antimony	Sb	120·	119·5	119·6	120·
	Argon	A	39·9			
	Arsenic	As	75·	74·45	74·9	74·9
	Barium	Ba	137·4	136·4	136·9	136·8
	Beryllium	Be	9·1	9·	9·03	9·
	Bismuth	Bi	208·5	206·5	208·9	210·
	Boron	B	11·	10·9	10·9	11·
	Bromine	Br	79·96	79·34	79·76	79·8
	Cadmium	Cd	112·	111·55	111·5	111·8
	Caesium	Cs	133·	131·9	132·7	132·6
	Calcium	Ca	40·	39·8	39·91	40·
	Carbon	C	12·	11·9	11·97	12·
	Cerium	Ce	140·	138·	139·9	141·
	Chlorine	Cl	35·45	35·18	35·37	35·4
	Chromium	Cr	52·1	51·7	52·	52·4
	Cobalt	Co	59·	58·55	58·6	58·9
Nb.	Columbium	Co	94·2	93·	93·7	94·
	Copper	Cu	63·6	63·1	63·18	63·2
Nd. Pr.	Didymium	Di			142.	144·6
	Erbium	Er	166·	164·7	166·	165·9
	Fluorine	F	19·	18·9	19·	19·
	Gadolinium	Gd	156·	155·8		
	Gallium	Ga	70·	69·5	69·9	68·8
	Germanium	Ge	72·	71·9	72·3	
	Gold	Au	197·2	195·7	196·7	196·2
	Helium	He	4·			
	Hydrogen	H	1·008	1·	1·	1·
	Indium	In	114·	113·1	113·6	113·4
	Iodine	I	126·85	125·89	126·53	126·6
	Iridium	Ir	193·	191·7	192·5	192·7

		O = 16	H = 1	1890 U.S.P.	1880 U.S.P.
Iron	Fe	56·	55·6	55·85	55·9
Krypton	Kr	45·			
Lanthanum	La	138·	137·6	138·2	138·5
Lead	Pb	206·9	205·36	206·4	206·5
Lithium	Li	7·03	6·97	7·01	7·
Magnesium	Mg	24·36	24·1	24·3	24·
Manganese	Mn	55·	54·6	54·8	54·
Mercury	Hg	200·3	198·5	199·8	199·7
Molybdenum	Mo	96·	95·3	95·9	95·5
Neodidymium	Nd	143·6	142·5		
Neon	Ne	20·			
Nickel	Ni	58·7	58·25	58·6	58·
Niobium	Nb	94·2	93·		
Nitrogen	N	14·04	13·93	14·01	14·
Osmium	Os	191·	189·6	190·3	198·5
Oxygen	O	16·	15·88	15·96	16·
Palladium	Pd	106·	106·2	106·35	105·7
Phosphorus	P	31·	30·75	30·96	31·
Platinum	Pl	194·8	193·4	194·3	194·4
Potassium	K	39·15	38·82	39·03	39·
Praseodidymium	Pr	140·5	139·4		
Rhodium	Rh	103·	102·2	102·09	104·1
Rubidium	Rb	85·4	84·75	85·2	85·3
Ruthenium	Ru	101·7	100·9	101·4	104·2
Samarium	Sm	150·	149·2	149·62	
Scandium	Sc	44·1	43·8	43·97	44·
Selenium	Se	79·1	78·6	78·87	78·8
Silicon	Si	28·4	28·2	28·3	28·
Silver	Ag	107·93	107·11	107·66	107·7
Sodium	Na	23·05	22·88	23·	23·
Strontium	Sr	87·6	86·95	87·3	87·4
Sulphur	S	32·06	31·83	31·98	32·
Tantalum	Ta	183·	181·5	182·	182·
Tellurium	Te	127·	126·5	125·	125.
Terbium	Tb	160·	158·8	159·1	
Thallium	Tl	204·1	202·61	203·7	203·7
Thorium	Th	232·5	230·8	231·9	233.
Thulium	Tu	171·	169·4		
Tin	Sn	118·5	118·1	118·8	117·7
Titanium	Ti	48·1	47·8	48·	48·
Tungsten	W	184·	182·6	183·6	183.6
Uranium	U	239·5	237·8	238·8	238·5
Vanadium	V	51·2	51·	51·1	51·3
Xenon	X	65·			
Ytterbium	Yb	173.	171·9	172·6	172·7
Yttrium	Yt	89·	88·3	88·9	89·8
Zinc	Zn	65·4	64·9	65·1	64·9
Zirconium	Zr	90·7	89·7	90·4	90.

THE IDENTIFICATION AND PROPERTIES OF *a*- AND *β*-EUCAINE.[1]

By Charles Lathrop Parsons.

(*Concluded from page 342.*)

MICROSCOPIC CHARACTERISTICS.

A careful examination of many of the precipitates which the various reagents yield with either of the eucaines or with cocaine failed to disclose any special characteristic of value. Many of them are beautifully crystalline and give striking displays of color with polarized light, but they vary too much with different conditions to be used with certainty as a means of identification. An examination of the alkaloids themselves as precipitated by ammonia and crystallized from chloroform also give negative results. Fortunately, however, the hydrochlorides, when pure, are easily identified under the polarizing microscope, and especially is cocaine hydrochloride recognizable at once.

The slides are best prepared by allowing a drop of an aqueous solution to spontaneously evaporate. Cocaine under these conditions does not always crystallize at once even when quite dry. But if set aside for a few hours the crystals will form and the peculiar feathery and fan-shaped radiations, resembling very closely those seen on a broken nodule of wavellite, are recognizable even with the naked eye. The examination is most satisfactorily performed with a magnifying power of about 250 diameters.

a-Eucaine hydrochloride in saturated solution tends to crystallize in little spots which, under polarized light, look like very highly colored rosettes made up of very small crystals, so that the field is always bright, never showing any constancy of extinction directions. On edges of drop, the rosettes sometimes show small feathery forms of crystals of which the extinction directions vary but are more often diagonal. A 5 per cent. solution gives much the same result. The rosettes frequently appear to be made up of concentric rings of very small crystals, the centre of rosettes being thicker than edges, and only the edges showing plate or feather forms large enough to be examined as individuals. Interference colors are very bright. When crystallized from dilute solution the rosette forms may

[1] Read at the Denver meeting of the American Chemical Society, August 29, 1901, and reprinted from the *Jour. Amer. Chem. Soc.*, 1901, p. 885.

become very small and numerous, covering the entire field, while the interference colors are only gray or black. The forms of gray and black overlying feathers are at times very prominent in *α*-eucaine, and resemble nothing so closely as the small feathers of Plymouth Rock poultry.

β-Eucaine hydrochloride from saturated solution shows broad feathery or fern-like forms, sometimes blade-like or tabular. Usually the tabular forms show concentric rings of high color around the edges and the extinction directions are easily determined. They are usually slightly oblique to the main axis of the crystal, but different crystals show two separate angles of extinction, one being the complement of the other and due to the fact that the individuals are viewed from opposite sides. The forms already mentioned are more apt to be found around the outer edge of the evaporated drop, while the centre is made up of isolated individuals which show brilliant tabular and prismatic forms, sometimes quite small and rod-like. Rarely they are diamond-shaped. These diamond-shaped forms sometimes show extinction directions symmetrical to the main axis, but more often slightly oblique. The individual crystals are large and much more easily studied than those of *α*-eucaine. If more dilute solutions of less than 1·5 per cent. are used, the characteristics do not come out so plainly, the crystal forms being smaller and showing very low interference colors, mainly light grays. Also these sometimes show feathery forms and rosette forms something like *α*-eucaine.

Cocaine hydrochloride in 10 per cent. to 1 per cent. solution crystallizes in fan-like shapes. A 2 per cent. solution gives a solid field of radiating forms, the individuals of which resemble very closely the forms sometimes seen on a frosted window. Extinction is parallel and perpendicular to the main axis of the crystals. Colors are brilliant and the whole field is characteristic, enabling one to distinguish cocaine immediately. With dilute solutions the fan-like shapes are still marked, but the field is sometimes broken and interference colors are a slow order of light grays.

In conclusion it is perhaps well to suggest that in working on unknown substances all tests for eucaine and cocaine, as with other alkaloids, are much more valuable when compared with those of samples whose identity is known.

NEW HAMPSHIRE COLLEGE.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

PROCEEDINGS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION at the Forty-ninth Annual Meeting, held at St. Louis, Mo., September, 1901. Also the Constitution, By-Laws and Roll of Members. Baltimore, 1901.

While an abstract of the proceedings of the last meeting of this Association has been published in many of the pharmaceutical and drug journals, this should only cause greater interest in the official records of the Association, containing as they do not only the papers in full, but the discussions which were in some cases most profitable and interesting. The progressive worker only requires a hint to enlarge the sphere of his activity and make more effective the work he is doing. In the 500 pages of the Proceedings are many hints for not only the teacher and manufacturer, but the retail pharmacist as well. Probably no previous issue of the Proceedings has contained so much in the line of modern drug-store methods, particularly applicable to the work of the retail pharmacist, as the volume now referred to.

The "Report on the Progress of Pharmacy," by Professor Diehl, serves to enhance the value of the volume, and one may well ask: Where is there such a repository of information of the year's progress as in the Proceedings of the American Pharmaceutical Association?

THE ELEMENTS OF PHYSICAL CHEMISTRY. By J. Livingston R. Morgan. Second edition, revised and enlarged. X + 352 pp., 12mo, cloth, $2.00. New York: John Wiley & Sons. London: Chapman & Hall, Limited. 1902.

Applied as well as pure chemistry is dependent for its returns upon the principles of physical chemistry. The labors of Ostwald, Le Blanc, Nernst and others have caused almost a revolutionary aspect in regard to the nature of solutions, chemical reactions and the rôle of ions in analytical chemistry. These subjects being comparatively new, many persons are unable to obtain a comprehensive outline of the subject, owing to the length of time which is necessary to spend upon the separate volumes devoted to these subjects. This volume is especially intended as a text-book for either class-work or self-instruction, and although calculus is used in the derivation of some of the laws, still much can

be done without any training in the higher mathematics. In general, references are given, so that any one wishing to make an extended study of any special portion may do so with little difficulty. The amount of the subject included, however, embraces all that which is likely to be useful to all chemists.

In the preparation of the second edition the author has endeavored to do three things: (*a*) To bring the subject-matter itself up to date; (*b*) to make, wherever possible, the relations clearer than before; (*c*) to make the book itself more useful to those studying the subject without an instructor. The physical meaning of all relations is shown, so that those who have not sufficient mathematical training to actually derive the single relations will at least understand them and be able to apply them when necessary. Following the advice of Professor Ostwald, the chapter on the rôle of the ions in analytical chemistry has been given a place in Chapter VII between chemical equilibrium and kinetics. In Chapter X a collection of problems is given which will show the value and application of each important relation considered. This collection will be particularly acceptable to those studying alone, as well as to others who have already studied the subject, but not yet attempted to apply it.

The following subjects are treated in the respective chapters: (1) Physical chemistry, energy, the factors of energy and the methods for the determination of the atomic weight; (2) the gaseous state; (3) the liquid state; (4) the solid state; (5) solution; (6) thermochemistry; (7) chemical change, (*a*) equilibrium, (*b*) the rôle of ions in analytical chemistry, (*c*) chemical kinetics; (8) the phase-rule and the equilibrium of water in its phases; (9) electrochemistry, the migration of the ions, the conductivity of electrolytes, electromotive force, electrolysis and polarization; (10) problems showing the value and application of the chapters considered.

The book is to be commended most heartily to every one having an interest in the principles of chemistry.

INDICATORS AND TEST-PAPERS. By Alfred I. Cohn. Second edition, revised and enlarged. $2.00. New York: John Wiley & Sons; London: Chapman & Hall, Limited, 1902.

The first edition of this book was favorably reviewed in this JOURNAL for January, 1900. In the second edition the work has been

brought up to date by the addition of an appendix, embodying the information on the indicators introduced since the appearance of the first edition. In this list are mentioned: alizarin green B, ammoniacal copper solution, corallin—malachite green, diazoparanitraniline—propylmetacresol, iron isopyrotritarate, iron salicylate, patent blue L, perezol, potassium ferrocyanide with ammonium molybdate, and sodium alizarinsulphonate.

The work is systematically arranged, reliable, and a practical guide for the laboratory worker, as well as a ready means of reference to all desiring any information on the source, preparation and application of indicators and test-papers, as well as their tests for sensitiveness.

A Laboratory Guide to the Study of Qualitative Analysis. By E. H. S. Bailey and Hamilton P. Cady. Fourth edition. 12mo, 235 pp., cloth, $1.25 net. Philadelphia: P. Blakiston's Son & Co., 1901.

While there are many manuals on qualitative analysis, still any work in which are considered the more modern theories underlying analytical chemistry, and which attempts to present some new facts and investigations, is very much desired. In the present work the authors apply the dissociation theory of Arrhenius and the law of mass action as enunciated by Gulberg and Waage in correlating and interpreting chemical phenomena, and give a new method for the separation of arsenic, antimony and tin and also for the separation and identification of the acids.

The properties of the metals and precipitates with the special tests, blowpipe reactions are given and numerous notes of special precautions are interspersed in the text. The methods of separation of the ions and various groups, as also the special methods for examining unknown substances, are also valuable.

The book is distinctly a modern one and is inspired by the several foundation works of Ostwald in inorganic and analytical chemistry. It is an interesting and valuable work on qualitative analytical chemistry.

Die Rohstoffe des Pflanzenreiches. Versuch einer technischen Rohstofflehre des Pflanzenreiches. Von Dr. Julius Wiesner. 2te gänzlich umgearbeitete und erweiterte Auflage. 7. Lieferung (Bd. II, Bogen 11–20); 8. Lieferung (Bd. II, Bogen 21–30). Mit Textfigur 45–75. Leipzig: Verlag von Wilhelm Engelmann, 1901–1902.

As has already been stated in previous reviews of the second revised and enlarged edition of Wiesner's "Raw Materials of the Plant Kingdom," it is not only the production of Dr. Wiesner, but of twelve other collaborators. Most of Parts VII and VIII are devoted to the consideration of the fibres. A small portion of Part VII contains the end of the chapters on Woods and a few pages of Part VIII contain an introduction to the root and rhizome products of plants.

The fibres are treated as follows: (1) Anatomischer Bau der Fasern; (2) Die physikalischen Eigenschaften der Fasern; (3) Chemische Eigenschaften der Fasern; (4) Die Kennzeichen der Fasern; (5) Uebersicht der Faserpflanzen; (6) Uebersicht der nachfolgend abgehandelten technisch verwendeten Pflanzenfasern.

These parts, like those previously reviewed in this JOURNAL, reflect great credit upon the authors, and the work when complete will be indispensable to all those interested in the technical products of the plant kingdom.

DIGEST OF CRITICISMS ON THE UNITED STATES PHARMACOPŒIA. Seventh Decennial Revision (1900). Part III, comprising abstracts of papers up to May 15, 1901.

Part II of the Digest of Criticisms contained abstracts from accessible literature to January 1, 1898. This part was the last compiled by the late Hans M. Wilder. Shortly after Mr. Wilder's death (January 25, 1901), the late Dr. Charles Rice, Chairman of the Committee of Revision, requested Prof. Henry Kraemer to take charge of the preparation of Part III, the work to be done by Florence Yaple, Ph.G., Philadelphia. This part includes the abstracts of pharmaceutical literature during the years 1898, 1899 and 1900, and as much of the literature of 1901 as could be arranged by May 15th without further delaying the work, and was prepared in less than four months. Any one desiring a copy of Part III of the Digest of Criticisms may obtain the same by addressing Prof. Joseph P. Remington, Chairman of the Revision Committee, and forwarding six cents per copy to cover the amount of postage.

PHARMACEUTICAL MEETING.

The seventh of the series of pharmaceutical meetings of the Philadelphia College of Pharmacy for 1901–1902 was held on Tuesday,

April 15th. Mr. Joseph W. England, Curator of the Museum, presided. The first paper read was "Notes on Specific Gravity," by Thomas S. Wiegand, the Librarian of the College (see page 230). In discussing the paper Mr. Gustavus Pile said that for the ordinary determination of specific gravity of liquids, the use of the hydrometer was more easily understood and applied than a balance, and more accurate than a specific gravity bottle. It was possible with the hydrometer possessing a large bulb and small stem to have the graduations sufficiently delicate to detect a variation of the fifth of a grain. One of the most serious difficulties in taking specific gravity is that occasioned by the variation in temperature, and the speaker favored the adoption of one temperature rather than having two standard temperatures, viz.: 39° and 60°. He said that in the construction of hydrometers everything depended upon having a correct standard of comparison. All other instruments are then made from this and the rulings made from tables which have been previously worked out. Mr. Pile further said that the displacement of air was not as great a source of error as is generally supposed, and that any two liquids will displace nearly the same amount of air.

The next paper was on "Chamois Skins," by Charles C. Drueding (see page 224). The paper was illustrated with a large number of commercial varieties which showed the steps in their preparation for the market.

The discussion on the definition of the term spoonful and its metric equivalent was opened by M. I. Wilbert (see page 218). Mr. England said that apparently no one had so exhaustively gone into this subject before as Mr. Wilbert, and that a campaign of education seemed necessary to overcome the prevailing customs and notions on these subjects. He suggested that some of the difficulties might be overcome by the physician writing "a teaspoon *even* full" or a "teaspoon *heaping* full." Mr. C. Carroll Meyer did not favor this suggestion, as he considered that it would add to the length of the directions on the label and that this was considerable, particularly when medicines were dispensed in half- or one-ounce bottles. Mr. George M. Beringer said that the physician calculates the doses of the prescription in one, two and four fluid drachms, and that while we cannot influence the size of spoons, yet we can make suggestions to the manufacturer of medicine glasses. He further said that he had in

mind the construction of a graduate as a medicine glass in which the lower part was conical and graduated, and the upper part so constructed as to facilitate the administration of the medicine. He further said that we ought not to introduce the transposition of doses, and that we ought to endeavor to carry out the decimal measures on graduates independent of their spoon equivalents. Mr. Meyer said that he believed that the people will continue to use spoons in measuring medicines. Mr. E. M. Boring considered that the physician could control the subject more than any one else and could influence the use of medicine glasses. Miss Anna C. Ross, P.D., alluded to some of the troubles connected with the subject in dispensary work. Mr. Wilbert, in closing the subject, said that in using teaspoons, metric equivalents were closely approximated. He offered the following resolutions, which, with the amendments as finally adopted, are herewith given:

WHEREAS, it is desirable to secure greater accuracy and more uniformity in the measuring out or administration of doses of liquid medicines.

Therefore, be it Resolved, That we, members of the Philadelphia College of Pharmacy, assembled at this pharmaceutical meeting, recommend the use of accurately graduated glass dose measures; these measures to be constructed so that the height of the contained liquid, at a spoonful mark, is greater than its diameter.

Resolved, That for use in connection with spoons as dose measures, we recommend the promulgation of the following definition taken from the French Codex:

"A spoon is full when the liquid it contains comes up to, but does not show a curve above, the upper edge or rim of the bowl."

Resolved, That for use in connection with the metric system of weights and measures, we recommend the adoption of the following approximate equivalents of spoonfuls.

1 teaspoonful equals 5 c.c.

1 dessertspoonful equals 2 teaspoonfuls or 10 c.c.

1 tablespoonful equals 3 teaspoonfuls or 15 c.c.

Resolved, That a copy of these resolutions be sent to the chairman of the Committee on the Metric System of the American Pharmaceutical Association and the secretaries of the American Medical Association and Philadelphia County Medical Society, for the purpose of their consideration and the securing of uniform action on this subject.

Mr. William McIntyre said that inasmuch as it was proposed in the report of the Committee on Pharmaceutical Meetings at the annual meeting of the College, to provide a permanent fund for carrying on these meetings, he desired to give $65.00 additional

to what he had already given to the committee, thus making his contribution to this fund $100.00. Mr. McIntyre's gift was accepted and a unanimous vote of thanks was tendered him.

At the next meeting, on May 20th, which will be the last of the present series, an interesting programme will be presented.

H. K.

PHILADELPHIA COLLEGE OF PHARMACY.

THE EIGHTY-FIRST ANNUAL COMMENCEMENT.

The exercises connected with conferring the degrees of Doctor of Pharmacy and Pharmaceutical Chemist were held in the Academy of Music, Thursday evening, April 17th. Prayer was offered by Rev. Edgar Cope. The degrees were conferred by the President, Howard B. French. The following received the degree of Doctor of Pharmacy (P.D.):

Name.	*Subject of Thesis.*	*State.*
Ackerman, William Brown,	*Some Notes on the Morphology and Cultivation of Digitalis,*	Pennsylvania.
Alston, William Algernon,	*Cinchona,*	S. Carolina.
Baer, Herbert Oscar,	*Liquor Ferri Chloridi,*	W. Virginia.
Beegle, David Elmer,	*Suprarenal Glands,*	Pennsylvania.
Berberich, Joseph Herman,	*Morphine and its Antidotes,*	Germany.
Binder, Arthur Henry,	*Cereus Grandiflorus,*	Pennsylvania.
Blew, Robert St. Clair,	*Arsenic and its Antidote,*	New Jersey.
Blough, Elijah Robert,	*Cultivated Hydrastis,*	Pennsylvania.
Borneman, John Alexander,	*Naturalization of Medicinal Plants in the United States,*	Germany.
Brookes, Virginia Cade, P.C.	*Mesquite Gum,*	Texas.
Brown, Horsey Pierce,	*Antidiphtheritic Serum,*	Delaware.
Caden, Alice Beatrice,	*The Valuation of Pepsin with Dried Egg Albumen,*	Kentucky.
Catlin, Joseph Albert,	*Cannabis Indica,*	Maryland.
Clemmer, John Krupp,	*Aloin,*	Pennsylvania.
Craven, Alfred Young,	*Heroin,*	Pennsylvania.
Crawford, Thomas Foster,	*Iodine,*	Scotland.
Croft, Clarence,	*Aloes,*	Pennsylvania.
Crothers, Anthony Brooks,	*Kaolin,*	Maryland.
Dickinson, Ralph Brinton,	*Cocainæ Hydrochloras,*	Pennsylvania.
Douglass, John Xavier	*Smokeless Powder and its Advantages,*	Pennsylvania.
Downs, William Joseph,	*Nux Vomica,*	Pennsylvania.
Dulaney, Joseph Field,	*Nutrient Gelatin and Agar-Agar Media,*	Texas.
Eckels, Nathaniel Ort,	*Emulsion of Terebene,*	Pennsylvania.
Evans, Thomas John,	*Aqua Hydrogenii Dioxidi,*	Pennsylvania.
Eves, Charles Scott,	*The Hypophosphites,*	Pennsylvania.
Evrard, John Joseph,	*Coal Tar Products,*	Pennsylvania.

Name.	*Subject of Thesis.*	*State.*
Fetterolf, Clarence F. G.,	*Xanthium Canadense*,	Pennsylvania.
Filman, Walter Theodore,	*Oleum Santali*,	Pennsylvania.
Fitch, James Clarence,	*Fat-free Tincture of Digitalis*,	Pennsylvania.
Fleischer, William Paul,	*The Different Varieties of Ipecac*,	Pennsylvania.
Fox, Irvin Berry,	*The Economics of a Retail Pharmacist Collecting and Powdering his own Crude Drugs*,	Pennsylvania.
Fox, Joseph Peter,	*Cascara Sagrada*,	Pennsylvania.
Fried, Percy,	*Urotropin*,	Pennsylvania.
Gamer, Albert Charles C.,	*Public Sanitation*,	California.
Gehringer, Edwin Franklin,	*Sodii Chloridum*,	Pennsylvania.
Geron, Yeatman,	*Ergota*,	Alabama.
Gettel, John Ralph Elsrode,	*Rhamnus Purshiana*,	Pennsylvania.
Gliem, Harry Charles,	*Therapeutics of Digitalis*,	Pennsylvania.
Goodman, Edith Morton,	*Diphtheria Antitoxin; its Preparation and Recognition by the Pharmacopœia*,	Colorado.
Goring, Myatt Edward,	*Pepsinum*,	New York.
Grove, Harry Ross,	*The Physiological Action and Therapeutic Uses of Ergot*,	Pennsylvania.
Handwork, Francis Collins,	*Official Medicinal Plants growing in the vicinity of Philadelphia*,	Pennsylvania.
Heffelfinger, Wm. Edward,	*Administration of Cod Liver Oil*,	Pennsylvania.
Hendrickson, Raymond,	*Nutgall Ink*,	California.
Hertzler, Norman Eberly,	*Pyroxylinum*,	Pennsylvania.
Hertzler, Oliver Henry,	*Acetic Acid as a Menstruum in the Manufacture of Fluid Extracts*,	Pennsylvania.
Hilliard, Bayard,	*Apomorphine Hydrochlorate*,	New Jersey.
Jones, Howard Harlan,	*Acidum Gallicum*,	Pennsylvania.
Kellar, William Albert,	*Eucaine and its Salts. Eucaine Hydrochlorate*,	Colorado.
Kirk, Frank Hall,	*Petroleum and its Therapeutic Uses*,	Pennsylvania.
Knabb, Daniel Milton,	*Syrupus Hypophosphitum*,	Pennsylvania.
Knauss, Howard James,	*Acidum Carbolicum*,	Pennsylvania.
Kyle, Christian Bauer,	*Acetone*,	Pennsylvania.
Lescure, Anna Rosalie,	*Disinfectants and Antiseptics*,	Pennsylvania.
Levering, John Hartranft,	*Liquor Potassii Arsenitis*,	Pennsylvania.
Lewis, Herbert Willard,	*Olive Oil Adulteration*,	Massachusetts.
Lide, Leighton Elba,	*The Manufacture of Cotton Seed Oil*,	Mississippi.
McGarrah, Wm. Henry, Jr.,	*The Art of Filling Capsules*,	Pennsylvania.
MacGregor, Albert Dell,	*Tests for the Identification of Formaldehyde in Milk and Food*,	Illinois.
McLaughlin, Harry A.,	*Peppermint and Spearmint*,	Pennsylvania.
Marcus, Simon,	*Phytolaccæ Radix*,	Pennsylvania.
Margolin, Fannie Bezman,	*Petroleum*,	Russia.
Martin, Charles Edward,	*Kaolin*,	Pennsylvania.
Martin, Frederick Adam,	*Acidum Benzoicum*,	New Jersey.
Matlack, Walter Ball,	*Digitalis and its Preparations*,	New Jersey.

Name.	*Subject of Thesis.*	*State.*
Meals, Ira Dale,	*Zinc Oxide*,	Pennsylvania.
Meredith, Wilbur Curtis,	*Digitalis*,	Pennsylvania.
Metzler, Oscar LeRoy,	*Cocillana*,	Pennsylvania.
Myers, Luther Melancthon,	*Pepsinum*,	Pennsylvania.
Oberly, John S.,	*Ginseng and its Cultivation*,	Pennsylvania.
Parker, James Heber,	*The Estimation of Formaldehyde*,	Pennsylvania.
Penrose, Thos. Wm., P. C.,	*Distilled Water*,	Pennsylvania.
Quinn, Vincent DePaul,	*Cinchona*,	Pennsylvania.
Ramsaur, David Wilfong,	*Serenoa Serrulata*,	Florida.
Reeve, Alfred Warffuell,	*Comparative Solubility of the Chemicals of the U.S.P. and the B.P.*,	New Jersey.
Reice, Isaac Stephen,	*Belladonna*,	Pennsylvania.
Rhodes, Geo. Washington,	*The Physician and the Pharmacist*,	Maryland.
Robinson, David Crogman,	*Strophanthus*,	Pennsylvania.
Robinson, Thos. H., Jr.,	*Unguentum Zinci Oxidi*,	Virginia.
Roeder, Maurice Albert,	*Syrup of Tolu*,	Pennsylvania.
Rudolph, Harold Clarence,	*Vaccine Virus*,	Pennsylvania.
Schmidt, Oscar Carl,	*Liquor Magnesii Citratis*,	Pennsylvania.
Shenkle, Albert Philip,	*Gentiana*,	Pennsylvania.
Slobig, Charles Henry,	*Petroleum*,	Pennsylvania.
Smith, Alfred Homer,	*Codeina*,	Delaware.
Smith, Henry William,	*Copper*,	Pennsylvania.
Smith, Wm. David Harris,	*A comparison of the several parts of Cassia Marilandica with the Leaflets of Cassia Acutifolia*,	Tennessee.
Soken, Joseph Louis,	*Argon*,	Russia.
Strauss, Robert Franklin,	*Podophyllum*,	Pennsylvania.
Stuver, Henry William,	*Emulsion of Liquid Petroleum*,	Colorado.
Swartz, William Luther,	*Pills and their Excipients*,	Pennsylvania.
Thomas, George Carroll,	*Guarana*,	Pennsylvania.
Toulson, John Milburn,	*Phytolacca*,	Maryland.
Tyler, Ephraim Shaw,	*The Opium Preparations of the U.S.P.*,	New Jersey.
Ulrich, Ralph Thomas,	*What is a Fruit?*	Pennsylvania.
Weidemann, Geo. B., B. S.,	*Tinctura Opii Deodorata*,	Pennsylvania.
Weigester, Wilson,	*Gonococcus*,	Pennsylvania.
Welch, William Herbert,	*Tannic Acid*,	Pennsylvania.
Williams, Morrison Patton,	*Official Plants of the Labiatæ*,	N. Carolina.
Wilson, Oscar Hermon,	*Cinchona*,	Pennsylvania.
Winkler, Max Erwin,	*An Antidote Cabinet*,	Pennsylvania.
Wisegarver, Oscar Kline,	*Biological Products*,	Pennsylvania.
Woodill, Robert Franklin,	*Urine Analysis by Pharmacists*,	Massachusetts.
Worthington, J. W. Wolf,	*Mercury with Chalk*,	Pennsylvania.
Ziegler, Charles Norman,	*Oleum Morrhuæ*,	Pennsylvania.
Ziegler, Wm. Lodge, Jr.,	*Maltum*,	Pennsylvania.

The following received the degree of Pharmaceutical Chemist (P.C.):

Name.	*Subject of Thesis.*	*State.*
Baker, Daniel,	*Fat-free Tincture of Strophanthus*,	Pennsylvania.
Miller, Roy Leonard,	*Assay of Extractum Nucis Vomicæ*,	Maryland.

ANNOUNCEMENT BY THE DEAN. Prof. Joseph P. Remington stated that an unusually high average had been attained by the members of this class, and that the President's cup, offered by Howard B. French, was awarded them and would be held by them until some succeeding class should attain a higher grade of scholarship. The following received the grade of distinguished: Daniel Milton Knabb, John S. Oberly, James Heber Parker, William David Harris Smith, Morrison Patton Williams, Oscar Hermon Wilson, Joseph Field Dulaney. The following were meritorious: Albert Charles C. Gamer, John Milburn Toulson, William Herbert Welch, J. Warren Wolf Worthington.

THE VALEDICTORY ADDRESS was delivered by Hon. Charles Emory Smith, ex-Postmaster-General. After briefly reviewing the history and work of the College, Mr. Smith alluded to the beneficent work of the apothecary since the time of Hippocrates, and in this connection made a number of quotations from the classics. In closing he urged the graduates to be thorough in all they did and masters of their work; thoroughness with tact and common-sense he considered were the requisites for a successful life.

AWARD OF PRIZES.

THE PROCTER PRIZE of a gold medal and certificate for the highest grade of scholarship and meritorious thesis was awarded to David Wilfong Ramsaur, and presented by Howard B. French.

THE WILLIAM B. WEBB MEMORIAL PRIZE of a gold medal and certificate, offered by Mrs. Rebecca T. Webb for the highest general average in the examinations of the Committee, Operative Pharmacy and Specimens, was awarded to Daniel Milton Knabb and presented by William J. Jenks. The following graduates received honorable mention in connection therewith: David Wilfong Ramsaur, William David Harris Smith.

THE CHEMISTRY PRIZE of $25, offered by Prof. Samuel P. Sadtler, for original work in quantitative analysis, was awarded to James Heber Parker, the following graduates receiving honorable mention in connection therewith: Raymond Hendrickson, Roy Leonard Miller.

THE MATERIA MEDICA PRIZE of $25, offered by Prof. C. B. Lowe, for the best examination in Materia Medica, the recognition of Materia Medica specimens, and a meritorious thesis, was awarded to John S. Oberly, the following receiving honorable mention in connection therewith: Daniel Milton Knabb, James Heber Parker, Alfred Homer Smith, William David Harris Smith, Oscar Hermon Wilson, J. Warren Wolf Worthington.

THE ANALYTICAL CHEMISTRY PRIZE of $25, offered by Prof. F. X. Moerk, for the best special examination in quantitative and qualitative analysis by students receiving the grade of "very satisfactory" in both the second and third years, was awarded to James Heber Parker, the following receiving honorable mention in this connection: Wilbur Curtis Meredith, David Wilfong Ramsaur, William David Harris Smith, Oscar Hermon Wilson.

THE MAISCH PRIZE of $20, offered by Mr. J. H. Redsecker, of Lebanon, Pa., for histological knowledge of drugs, was awarded to Oliver Henry Hertzler, and presented by Prof. Henry Kraemer, the following graduates receiving honorable mention in connection therewith: James Clarence Fitch, Albert Charles C. Gamer, Daniel Milton Knabb, David Wilfong Ramsaur, William David Harris Smith, Morrison Patton Williams.

THE OPERATIVE PHARMACY PRIZE of $20, offered by Prof. J. P. Remington, for the best examination in operative pharmacy, was awarded to J. Warren Wolf Worthington, the following graduates receiving honorable mention in this connection: William David Harris Smith, Daniel Milton Knabb, John Alexander Bornemann, David Wilfong Ramsaur, Howard James Knauss, Leighton Elba Lide, John Milburn Toulson, Yeatman Geron, Charles Scott Eves, Henry William Stuver, William Edward Heffelfinger, William Luther Swartz, Herbert Willard Lewis, John S. Oberly.

THE THEORETICAL PHARMACY PRIZE, consisting of a fine Troemner agate prescription balance, offered by Mr. M. N. Kline, for the best examination in theory and practice of pharmacy, was awarded to William David Harris Smith, and presented by Dr. C. A. Weidemann, the following receiving honorable mention in connection therewith: Daniel Milton Knabb, Albert Dell MacGregor, James Heber Parker, David Wilfong Ramsaur, George Buzby Weidemann, Wilson Weigester, William Herbert Welch, Oscar Kline Wisegarver.

THE INSTRUCTORS' PRIZE of $20, offered by the instructors for the highest term average in the branches of pharmacy, chemistry and materia medica, was awarded to John S. Oberly, and presented by Dr. J. L. D. Morison, the following graduates receiving honorable mention in connection therewith: James Heber Parker, William David Harris Smith, Oscar Hermon Wilson, Morrison Patton Williams, J. Warren Wolf Worthington, Albert Charles C. Gamer, David Wilfong Ramsaur, Joseph Field Dulaney.

THE COMMERCIAL TRAINING PRIZE of $20, offered by Prof. J. P. Remington, for the best examination in this branch, was awarded to Edith Morton Goodman, and presented by Dr. A. W. Miller, the following graduates receiving honorable mention in connection therewith: William Brown Ackerman, Herbert Oscar Baer, David Elmer Beegle, Nathaniel Ort Eckels, John Joseph Evrard, Albert Charles C. Gamer, Leighton Elba Lide, Albert Dell MacGregor, Frederick Adam Martin, John S. Oberly, James Heber Parker, David Wilfong Ramsaur, John Milburn Toulson, George Buzby Weidemann, Max Erwin Winkler, William Lodge Ziegler.

COMPLIMENTARY SUPPER OF THE FACULTY.

A complimentary supper was given to the graduating class by the members of the Faculty on Wednesday evening, April 16th, in the Museum of the College. Some of the officers and trustees of the College were present, as also other invited guests The grade of scholarship attained by this class being higher than that of the class last year, they were entitled to receive the President's cup. It was presented by the donor, Howard B. French, and received on behalf of the class by a specially selected committee.

Professor Remington acted as toastmaster, and toasts were responded to by the members of the Faculty and instructors, some of the members of the College and Board of Trustees, and by many of the members of the graduating class. The latter took this occasion to present Dr. J. L. D. Morison, retiring instructor in Materia Medica, with a watch-fob as a mark of their esteem.

BACCALAUREATE SERMON.

The baccalaureate services were held this year, as last year, in Christ Church, the sermon being delivered by the rector, the Rev. Dr. C. Ellis Stevens.

THE ALUMNI ASSOCIATION.

The thirty-eighth annual meeting of the Alumni Association was held in Alumni Hall, on Tuesday afternoon, at 2.30 o'clock, April 15th, with the President, John H. Hahn, in the chair.

Following the annual address of the President, reports from the officers and standing committees were read. The following officers were elected for the ensuing year: President, William G. Nebig; Vice-Presidents, Albert Oetinger and Jacob M. Baer; Treasurer, C. Carroll Meyer; Recording Secretary, William E. Krewson; Corresponding Secretary, Walter A. Rumsey; Board of Directors, John D. Burg, E. F. Cook, C. H. LaWall, William T. England and Rolland H. French.

The thirty-eighth annual reception was held in the evening of the same day in the College Museum, William G. Nebig, the newly-elected President, presiding. After the roll call by the Secretary, William E. Krewson, of new members elected during 1901–1902, they were addressed by Dr. Adolph W. Miller. The prizes offered by the Association were presented as follows:

The Alumni gold medal for the best general average of the Class of 1902 was presented by William G. Nebig to David Wilfong Ramsaur.

The Alumni prize certificates to the members of the class receiving the highest averages in each of the following branches were presented by Mahlon N. Kline:

Pharmacy, to Wm. David Harris Smith; Chemistry, to Morrison Patton Williams; Materia Medica, to John S. Oberly; General Pharmacy (Committee), to J. Warren W. Worthington; Operative Pharmacy, to J. Warren W. Worthington; Analytical Chemistry, to Joseph F. Dulaney; Specimens, to William Herbert Welch.

The Alumni silver medal was awarded to Chester Augustus Billedoux, for the best general average in the second year examination, and presented by Walter A. Rumsey.

The Alumni bronze medal was awarded to Miss Millicent Saxon Renshaw, for the best general average in the first year examination, and presented by Jacob M. Baer.

The class oration was given by Charles E. Martin; the poem by Alfred Y. Craven; the history by Wm. D. H. Smith, and the prophecy by M. A. Roeder.

EXAMINATION QUESTIONS.

The following is a copy of the questions given to the students of the Third-Year Class at their recent examinations. The examinations in Operative Pharmacy and Analytical Chemistry were practical, and were conducted in the respective laboratories; the others were written.

THEORY AND PRACTICE OF PHARMACY.

A—(1) How many pounds of 10 per cent. Ammonia Water (sp. gr. 0·960) can be made from 1 gallon of 28 per cent. Ammonia Water (sp. gr. 0·900)? (2) What are the U.S.P. requirements for the strength of Opium? (3) How many c.c. of Tincture of Opium assaying 1·4 per cent. morphine can be made from 50 oz. av. of Powdered Opium assaying 15·5 per cent. morphine?

B—Give the unabbreviated official or Latin name, ingredients, brief outline of process, and describe the appearance of blue ointment, compound chalk

powder, Lugol's solution, Zittman's decoction, carron oil and aromatic syrup of rhubarb.

C—Give the English name, ingredients, brief outline of process and describe the appearance of syrupus acidi hydriodici, tinctura opii deodorati, spiritus ætheris nitrosi, linimentum belladonnæ, vinum ferri amarum and unguentum chrysarobini.

D—(1) When and by whom was vaccination first introduced? (2) What observation was made by the discoverer which led to the original introduction of vaccination? (3) Describe the modern methods of preparing vaccine virus, stating the precautions necessary to guard against contamination from dangerous impurities.

E—(1) What is the difference between a Cerate and an Ointment? (2) State the circumstances under which a physician would select the following vehicles for external application: Lard, Hydrous Wool Fat, Oleic Acid, Petrolatum, Cerate. (3) What methods have been used to prevent or delay rancidity in fats? (4) What is the most effective method of preparing lard for pharmaceutical purposes so as to secure absence of odor and a proper consistency? (5) What are the advantages of collapsible tubes for dispensing ointments?

F—(1) Describe three kinds of gelatin capsules and state their uses. (2) How are capsules for holding liquids made? (3) How may each kind of capsule be filled by the apothecary?

G—(1) What is the object of pharmaceutical legislation? (2) What should be the qualifications of a Board of Pharmacy? (3) Why is there not a United States Pharmacy law? (4) Give the reasons for advocating the payment of all expenses of enforcing pharmacy laws by the State? (5) Why should all receipts be turned into the State treasury and all expenses be paid by the State? (6) Why should every registered pharmacist be compelled to have a diploma from a recognized college before taking his examination?

H—Criticise and translate the following. Write out with English names the ingredients and quantities. State how you would compound them, or what course you would pursue.

37421

℞	Acidi Carbolici	gtt. xx
	Sodii Bicarb.	
	Sodii Borat.	āā ʒj
	Glycerini	fʒj
	Aquæ ad.	fʒiv

4281

℞	Potas. Iod.	gr. iij
	Quin. Sulph.	gr. j
	Syr. Aurant.	ʒss
	Aquam ad.	ʒij

M.

73842, S. 99.

℞	Acid. Carbolici	ʒiss
	Liq. Plumb. S. Acet.	fʒij
	Aquæ q. s. ft.	fʒx
	Ft. Lotio Sec. Art.	

Sig.—Use externally.

J—Criticise and translate the following. Write out with English names the ingredients and quantities. State how you would compound them, or what course you would pursue. Give the meaning of the numbers and marks on the margin :

℞ Sarah McM.
M. S. gr. j
Am. Mur. ℥j
Mst. Fuscm. f℥iv
M. Sig.—℥ij in aq. ev. h.
682.

℞ Dg.
Pulv. Rad. Bellad. gr. 1/20
Flor. Benzœs
11321 Tannin Pur. āā gr. j
Sacch. Alb. F. P.
M. F. Pulv. D. T. D. Dir. No. XX.
Sig.—Evy mng & eng 1 powder to be given.
N. K.

℞ B. A. 20509.
Ol. Copaib. ♏ij
Magnesiæ gr. ij
Pulv. Acacia gr. j
M. ft. pil mitte tales xxxvj
B. J.

K—Fill up six of the labels upon the sheet attached, writing suitable directions for the prescriptions found on Questions H and J.

Then write three complete prescriptions upon the blanks printed on the sheet: (1) For a baby six moths old, suffering from indigestion and diarrhea (four powders containing magnesia in a proper dose). (2) One for an old lady requiring a tonic and nerve stimulant, containing Tincture of Nux Vomica, Diluted Nitrohydrochloric Acid and Elixir of Orange (teaspoonful dose, 8-ounce mixture). (3) One metric prescription for a man thirty years old, requiring a suppository containing Extract of Belladonna and Powdered Opium (12 suppositories).

Write labels for the prescriptions above, and also for the following: (4) One for an ointment to apply for a slight eruption on the face, hands and arms, due to sunburn. (5) One for 12 pills for an adult suffering from constipation.

Upon labels for Nos. 4 and 5 write the name and the kind of pills and ointment, and brief directions for use.

CHEMISTRY.

A—(1) Describe Acidum Stearicum and Acidum Oleicum. (2) Give the formulas of the alcohols and the hydrocarbons from which Stearic Acid and Oleic Acid respectively are derived. (3) To what series do they belong respectively? (4) What important reaction with fatty oils is dependent upon this distinction? (5) What are the pharmaceutical and technical uses of these two acids?

B—(1) Describe the pure Cellulose of the U.S.P., and give its official name. (2) What solvent for Cellulose is known? (3) What is the action of strong Sulphuric Acid upon Cellulose? What of dilute Sulphuric Acid? What of strong Nitric Acid? (4) What pharmaceutical products are obtained as the result of these several actions? (5) What important industrial applications for the same products?

C—(1) Write the structural formula for Acetanilidum, and state to what class it belongs. (2) Mention any other synthetic compounds of importance belonging to this class. (3) Show by formulas the difference between diphenylamine and phenylene-diamine. (4) What color tests in water analysis depend upon the use of these compounds? (5) Give the reactions for the formation of a di-azo compound and the production of a phenol from the same.

D—(1) Give the official name for phenol, and state its source and properties. (2) What are the pharmacopœial tests for phenol? (3) What compound is formed by the action of strong Nitric Acid upon phenol, and what is the character of the compound thus formed? (4) Name the two isomeric compounds $C_6H_4(CH_3)OH$ and $C_6H_5CH_2OH$ and state how you would establish the identity of each. (5) Name the isomeric compounds $C_6H_4(CH_3)Cl$ and $C_6H_5CH_2Cl$ and state by what reaction you can distinguish between them.

E—(1) What is the exact chemical name and structural formula of Salicylic Acid? (2) What are its natural sources? (3) Write the reactions for its synthetic formation. (4) Name the official salts and esters of Salicylic Acid. (5) Give the pharmacopœial tests for Salicylic Acid.

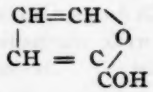
F—(1) What is the chemical distinction between an alkaloid and a glucoside? (2) By what chemical tests do you establish this difference? (3) What are some of the most important alkaloidal reagents? (4) What compounds are indicated as the underlying substances in the alkaloidal formulas? (5) By what reaction have glucosides been made artificially?

G—(1) Define a terpene and give a typical example, with an account of its properties. (2) What classes of compounds accompany the terpenes in their occurrence in nature? (3) Give examples of official essential oils that do not contain terpenes. (4) Into what several groups may resins be divided? Give the distinguishing characters of each.

H—Write the graphic formulas of: (1) Tartar Emetic. (2) Phenacetine. (3) Ortho-oxybenzoic Acid. (4) Benzaldehyde. (5) Gallic Acid. (6) B-Naphthol.

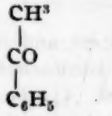
I—Give proper chemical names for:

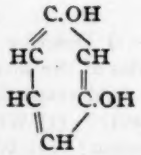
(1) $C_3H_5\begin{cases}OC_{18}H_{33}O\\OC_{18}H_{33}O\\OC_{18}H_{33}O\end{cases}$

(2) 

(3) $C_6H_5NH\text{-}NH_2$

(4) $C_6H_3\begin{cases}OH\\OCH_3\\COH\end{cases}$

(5) 

(6) 

K—Examples in Proximate Organic Analysis.

(1) How would you identify and determine the components in a mixture of free fatty acid, fatty oil, and mineral oil? (2) How would you identify and determine the components in a mixture of aromatic hydrocarbon, phenol and ketone?

MATERIA MEDICA.

A—Medical Terms, etc.—Define briefly the following terms, viz.: (1) Epispastic. (2) Antiseptic. (3) Escharotic. (4) Hypnotic. (5) Disinfectant. (6) Lithontriptic. (7) Ecbolic. (8) Errhine. (9) Cholagogue. (10) Sudorific. Give three illustrations of each of the above terms from the following list, viz.: Sulphonal, Podophyllin, Dover's Powder, Ergot, Mustard, Caustic Potassa, Corrosive Sublimate, Iodoform, Potassium Citrate, Pilocarpine, Nitric Acid, Formaldehyde, Savine, Veratrine, Trional, Aloin, Boric Acid, Lithium Citrate, Euonymin, Piperazin, Chloral, Carbolic Acid, Bloodroot, Mezereum, Hot Bath, Thymol, Cantharides, Arsenic, Cotton Root Bark, Ginger.

B—Official Names, etc.—Give the official names of the following and state what constitutes in each case the official drug: (1) Wolfsbane. (2) Woody Nightshade. (3) Mediterranean Onion. (4) Henbane. (5) Wormwood. (6) Indian Hemp. (7) Canadian Hemp. (8) Stinkasant. (9) Culver's Physic. (10) Blue Cohosh. (11) Succus Theabaicum. (12) Soldier's Friend. (13) Lactose. (14) Queen's Root. (15) Cutch. (16) Cleum Jecoris Aselli. (17) Indian Tobacco. (18) Oxgall. (19) Bitter Apple. (20) Spotted Hemlock.

C—Anti-Constipation Pills.—Write out a formula for twelve pills which shall contain the proper amounts of the following ingredients, viz.: Aloin, Extract of Nux Vomica, Extract of Belladonna, Extract of Physostigma. How should they be given?

D—Official Names, Natural Orders, etc.—Give the official names, natural orders and habitat of the drugs derived from the following origins, viz.: (1) Barosma crenulata. (2) Rhamus Purshiana. (3) Nicotiana Tabacum. (4) Cannabis Sativa. (5) Fraxinus ornus. (6) Croton Tiglium. (7) Ecballium Elaterinum. (8) Veronica virginica. (9) Pinus palustris. (10) Abies balsamea. (11) Brassica alba. (12) Melaleuca Leucadendron. (13) Citrus Bergamia. (14) Garcinia Hanburii. (15) Liquidamber orientalis. (16) Ruta graveolens. (17) Swertia Chirata. (18) Dryopteris Filix-mas. (19) Astragalus gummifera. (20) Claviceps purpurea.

E—N. O. Solanaceæ.—(1) Give the official names and active constituents of four leaf drugs, a fruit drug and a stem drug derived from plants belonging to this order. (2) Give the dose of four official alkaloidal salts derived from the above sources. (3) What is the action of the latter upon the pupil of the eye, and what are the drugs which act in this way called? (4) Name two official drugs that have an opposite action, and the class of drugs to which they belong.

F—Monkshood.—(1) State three prominent ways in which you would differentiate this drug from dandelion root. (2) State its alkaloidal constituents, and the acid with which they are combined. (3) What is the action of this drug upon the cutaneous sensory nerves, the heart and the respiration? (4) State the medicinal properties of this drug, and the method of giving it to get the best results. (5) How would you treat a case of poisoning by this drug?

G—Volatile Oils.—Give the Latin official names of the following, and the botanical names of the plants from which they are derived: (1) Oil of Flea-

bane. (2) Oil of Turpentine. (3) Oil of Cassia. (4) Oil of American Wormseed. (5) Oil of Allspice. (6) Oil of Cade. (7) Oil of Sweet Birch. (8) Oil of Wintergreen. (9) Oil of Pennyroyal. (10) Oil of Neroli. How should volatile oils be preserved, and what is the color of a medicinally active Oil of Fleabane?

H—Vegetable Purgatives.—(1) Give official names and doses of three laxative drugs. (2) Of three simple purgatives. (3) Of three drastic purgatives. (4) Of three cholagogue purgatives.

I—Copaiba.—(1) State the manner of its production. (2) How do the Para, the Rio Janeiro and the Maracaibo varieties differ from each other? (3) What is the best variety for making Massa Copaiba, and how should the others be treated to adapt them for this purpose? (4) What is the dose and action of this drug upon the mucous membrane of the bronchi and genito-urinary tract?

K—Emergency Case.—If a case were brought to your store exhibiting the following symptoms, viz: Complete unconsciousness, from which the patient cannot be roused, face flushed, eyes congested, pupils unequally dilated and uninfluenced by light, breathing stertorous, pulse slow but nearly normal, and perhaps paralysis of motion and sensibility of one side, what would be your diagnosis and treatment?

COMMITTEE.

A—Bismuth—(1) Give the unabbreviated official name, specific gravity and symbol. (2) Describe its physical properties. (3) In what form is Bismuth generally found in nature? (4) What process is used for purifying Bismuth? (5) Name the official salts of Bismuth. (6) What impurity are these salts liable to contain? (7) What is the pharmacopœial test for this impurity? (8) Give the important tests for the identification of Bismuth in solutions. (9) What important properties does Bismuth communicate to its alloys? (10) What are the medical uses of Bismuth?

B—(1) What is the difference between a granulated salt and one which is powdered? (2) Explain the cause of the formation of lumps during the process of granulation. (3) State how they may be avoided without resorting to trituration. (4) How are granulated Effervescing Salts made? (5) What advantages are gained by the administration of remedies in this form? (6) Give an outline of the formulas of two official granulated Effervescent Salts. (7) Name one or more common household chemicals which are usually seen in the granular form.

C—Cinchona Bark.—(1) Give the names of two official barks and their botanical origins. (2) What countries yield the principal supply of these barks? (3) What is meant by the terms "natural," "mossed" and "renewed" bark? (4) What is Grahe's test for Cinchona Bark? (5) What are the U.S.P. requirements for alkaloidal strength for the official barks? (6) What action does quinine have upon micro-organisms? (7) State the dose of quinine when given as a tonic, an antiperiodic, or as a prophylactic. (8) What are the disadvantages of quinine pills that are insoluble in the stomach?

D—Give the English name or synonym, ingredients, brief outline of process, and describe the appearance of Liq. Ferri et Ammonii Acetatis, Pilulæ Rhei Compositæ, Syrupus Ipecacuanhæ, Tinctura Gentianæ Compositæ, Vinum Antimonii and Spiritus Juniperi Compositus.

E—(1) If 5 pounds of Sodium Bicarbonate were accidentally emptied into a drawer which you knew contained just 9 pounds of Rochelle Salt, what would you do to remedy the mistake, and utilize the mixture? Give name of substance and quantity used to make it available. (2) How many c.c. would a mixture of the following liquids measure: 2,000 grammes each of water, alcohol and glycerin of official strength? (No allowance for contraction or temperature.)

F—*Volumetric Analysis.*—(1) What is a normal solution? (2) Illustrate by giving the molecular weights and grams used per liter of the following: Sulphuric Acid, Sodium Hydrate, Silver Nitrate, Iodine, Potassium Permanganate. (3) What are the advantages of volumetric solutions of lesser strength? (4) What are the disadvantages of most of the volumetric solutions of the U.S.P.? (5) Name the official volumetric solutions with which all other volumetric solutions can be standardized. (6) What is an indicator? (7) Name five of the more important indicators and name the chemicals or class of chemicals for which each is used.

G—*Ipecac.*—(1) Give the origin, habitat and constituents of Ipecac. (2) In what respects do the Rio and Carthagena varieties differ? (3) Can one be substituted for the other? (4) Mention some of the drugs that have been suggested as substitutes for Ipecac.

H—*Doses and Antidotes.*—Give the maximum single dose of each of the following. Also name the antidotes and physiological antagonists of the first five of them: Tincture of Aconite, Tincture of Digitalis, Cocaine Hydrochlorate, Morphine Sulphate, Strychnine Sulphate, Diluted Hydrocyanic Acid, Codeine Sulphate, Tincture of Nux Vomica, Atropine Sulphate, Hyoscyamine Sulphate.

I—(1) How would you compound the following prescription? State the object for directing the Salol coating.

℞	Argenti Nitratis	gr. x
	Pulv. Opii	gr. vj

M. ft. pil. No. XII. Coat with Salol and place in capsules coated with Salol.

Sig.—One every 3 hours.

(2) Criticise this prescription. What difficulties are likely to occur, and what precautions would you take to avoid them?

℞	Liq. Ammon. Acetat.	f℥iv
	Acid. Acetic	f℥j
	Tinct. Ferri Chloridi	f℥ss
	Glycerini	f℥ss
	Mucilago Acaciæ q. s. ft.	f℥viij
Misce.	Sig.—One teaspoonful every 2 hours.	

K.—(1) Write a prescription for thirty pills, using unabbreviated official names and expressing the quantities metrically, each pill to contain

℞	Arsenous Acid	gr. 1/20
	Aloin	gr. 1/6
	Vallet's Mass	gr. iss
	Cinchonidine Sulphate	gr. ij
	M. Sig.—One pill ter in die.	

Translate the directions and name the best excipient.

(2) State exactly how you would prepare the following prescription. Would you dispense it as written? Give reasons for your mode of procedure.

℞	Acidi Arsenosi	·5
	Potassii Bicarb.	1·
	Aq. Destillat.	100·

Ft. solutio sec. art.
Sig.—Let 4 c.c. be given every 2 hours.

Operative Pharmacy.

(1) Powders.

℞	Hydrarg. Chlor. Mit.	0·1	Gramme
	Pulv. Rhei	0·3	"
	Testæ Prep.	1·	"

M. ft. Chart. No. XII.

(2) Granular Effervescent Salt.

Sodium Phosphate	12·5	Grammes
Citric Acid	4·5	"
Tartaric Acid	6·75	"
Sodium Bicarbonate	12·5	"

(3) Ointment.

Mercury	2·5	Grammes
Nitric Acid	3·	C.c.
Nitric Acid	2.	"
Lard Oil	30·	"

(4) Emulsion.

Make 100 c.c. of an emulsion, by the English method, which must contain 50 per cent. of Cod Liver Oil. Put it in a bottle and write on the label the quantities of each ingredient used.

(5) Suppositories.

Extract of Stramonium	·50	Gramme
Tannic Acid	·50	"
Oil of Theobroma	6·	Grammes

Make six suppositories by rolling.

Analytical Chemistry.

(1) Describe the gravimetric and volumetric estimations of iron in Ferrous Sulphate. What are the advantages of the latter method?

(2) (*a*) Give the formula of the precipitate obtained in the quantitative determination of aluminum and state the change occurring during ignition. (*b*) How much "Alumen" will be equivalent to 0·153 of this ignited substance?

(3) (*a*) Why is it necessary, in the gasometric estimation of Hydrogen Dioxide, to make a correction for temperature before calculating percentage? (*b*) If a sample of Hydrogen Dioxide yields 11 volumes of oxygen at 20° C., what is its percentage strength?

(4) State the quantities of pure chemicals present in 200 c.c. of $\frac{2}{N}$ Hydrochloric Acid, of $\frac{N}{10}$ Barium Hydrate, of $\frac{N}{2}$ Ammonia.

(5) Name the volumetric solutions and indicators (stating the end-reaction in each case) used in titrating Ferric Chloride, Arsenous Oxide, and Phenol.

(6) (*a*) Calculate the factor of a silver nitrate v.s. 10 c.c. of which react with 8 c.c. $\frac{N}{10}$ Sodium Chloride v.s. (*b*) How much potassium Iodide will be equivalent to 1 c.c. of this silver nitrate v.s.?

(7) How would you standardize a Sulphuric Acid v.s.?

(8, 9 and 10) Volumetric estimations of Ferric Chloride, Arsenous Oxide, Phenol.

COMMERCIAL TRAINING.

A—Ordering Goods.—Write out an order for the following goods on Smith, Brown & Co., Wholesale Druggists, Boston, Mass. You are not known to them, but you have good credit. Be careful to use proper forms, abbreviations and details. Select any ten articles that you would be apt to need, each representing a different class of goods—say, 1 chemical, 1 drug, 1 fluid extract, 1 kind of soap, 1 kind of toothbrush, etc. Write the order in such form that the drug house would not be in doubt on any single point. Fold the order properly and place it in an envelope properly addressed.

B—Writing a Business Letter.—Write a model letter, asking for a position (containing about 100 words), to either a retail druggist, wholesale house, or manufacturer having a vacancy, giving such information about yourself as would be useful, and impressing the firm with the desirability of securing your services. Fold the letter properly and place it in an envelope properly addressed.

C—Bank Checks.—(1) Describe the formalities necessary in opening an account with a bank. (2) Under what circumstances does a bank require identification? (3) Why is identification necessary? (4) What are the titles of the usual officers and principal employees of a bank, and state very briefly their chief duties. (5) Why is a check sometimes drawn "to order" and sometimes "to bearer"? (6) Which manner of drawing is usually preferable, and why? (7) When you have received a check, drawn to your order, with your name misspelled, what course is to be pursued? (8) Draw a check upon the College of Pharmacy Bank for $80.75, upon the paper before you, omitting no necessary detail. (9) What is a "certified check"? (10) What is a "clearing house"?

D—Insurance.—(1) Define the business term "insurance." (2) Name four kinds of insurance in common use. (3) Define the terms "policy," "premium," "good risk," "hazardous." (4) What value has insurance in affecting the credit of an individual or firm? (5) What is meant by the contradictory term of a firm "insuring itself"? (6) Has life insurance value in establishing the credit of a business man? (7) What is the principal advantage of life insurance?

E—Transportation.—(1) When goods (small or large packages) are to be, sent to a distance, describe briefly but accurately, with proper business forms

how each kind may be transported. (2) How may money be sent with comparative safety to a distant point? (3) Name all of the methods that you know of, giving reasons for preferring one over the other under varying circumstances.

F—Commercial Terms.—Define the following terms: (1) Executor. (2) Administrator. (3) Power of Attorney. (4) Mercantile Agency. (5) F.O.B. (6) Will. (7) Mortgage. (8) Deed. (9) Lease. (10) Bill of Lading.

G—Card Indexes.—(1) Describe a card index for recording petty cash sales. (2) Name advantages and uses of the card index system for general purposes.

H—Promissory Notes.—(1) What is a promissory note? (2) Describe briefly their uses in business. (3) What is an accommodation note? (4) What risk is incurred through endorsing promissory notes? What is meant by a note "going to protest"?

I—Book-keeping.—(1) Define a book of original entry. (2) Day-Book. (3) Journal. (4) Cash-Book. (5) Ledger. (6) Posting. (7) Trial Balance.

K—Book-keeping.—(1) What two forms of book-keeping are practised? (2) Describe briefly the principle of each.

SPECIMENS.

The following specimens were placed before the members of the Class for recognition:

(1) *Pharmacy.*—Adeps Lanæ Hydrosus, Ceratum Resinæ, Elixir Aromaticum, Pulvis Ipecacuanhæ et Opii, Aqua Chloroformi, Syrupus Rosæ, Vinum Ferri Citratis, Tinctura Myrrhæ, Extractum Ergotæ Fluidum, Liquor Iodi Compositus.

(2) *Chemistry.*—Benzinum, Amylum, Sodii Salicylas, Acidum Tartaricum, Plumbi Oxidum, Acetanilidum, Potasii Ferrocyanidum, Acidum Tannicum, Glycerinum, Plumbi Acetas.

(3) *Materia Medica.*—Gentiana, Senega, Cimicifuga, Podophyllum, Frangula, Xanthoxylum, Matico, Digitalis, Chenopodium, Sinapis Nigra.

(4) *Committee.*—Tinctura Gentianæ Composita, Tinctura Benzoini Composita, Syrupus Ferri Iodidi, Magnesii Carbonas, Acidum Boricum, Potassi Bicarbonas, Stramonii Semen, Belladonnæ Folia, Aconitum, Sanguinaria.

ANNUAL MEETING.

The Annual Meeting of the Philadelphia College of Pharmacy was held on March 31st, at the College Building, 145 North Tenth Street.

Twenty-seven members were present, the President, Howard B. French, presiding.

The minutes of the quarterly meeting held December 30, 1901, were read and approved.

The minutes of the meetings of the Board of Trustees for December 3, 1901, January 7 and February 4, 1902, were read by the Registrar, W. Nelson Stem, and approved.

The annual meeting being the occasion for the reports of the officers and Standing Committees, these were given in the following order:

President's Report: The property at the present time is in fairly good condition. All necessary repairs have been made as economically as possible, yet it seems essential to have many things done to bring them up to that standard that is desirable for the institution to maintain.

The Faculty have worked most harmoniously for the best interests of the institution, and never within the knowledge of the President has more zealous and faithful work been done by the teaching force.

For the term 1901–02 there has been an increase of twenty-three students over the preceding year.

The Course in Commercial Training, which, while compulsory, is without cost to the students, has been attended by about 175 members of the Second- and Third-Year Classes.

There has been an increase in the number of special students in the Microscopical Laboratory, and quite a number have taken individual instruction in the Pharmaceutical Laboratory, in prescription compounding, and special work on theses.

In this connection commendation is made to the Assistant Director of the Pharmaceutical Laboratory, E. F. Cook, for suggesting and starting prescription compounding.

Since the last annual meeting seventeen new members have been elected and two members have resigned.

"In educational matters the institution has retained its leading position in the pharmaceutical world, yet your President would suggest the desirability of considering the advantage of establishing a Post-Graduate Course. The course of illustrated lectures delivered during the past winter was so largely attended and they were of such special value to the College that it would seem advisable for the Board of Trustees to arrange for a similar course next year. In conclusion the President expresses his appreciation of the active co-operation of his fellow-officers and others in authority."

Committee on Publication, by Samuel P. Sadtler. The AMERICAN JOURNAL OF PHARMACY has been issued regularly during the past year, and while the cost of printing and paper has advanced nearly 20 per cent. it has been possible to reduce the expenses along certain lines (as referred to in a previous report), so that the general running expenses have not been increased. The number of unsold volumes on hand is estimated at about 1,675, covering the period from 1829 to the present time. Some of the volumes are becoming extremely rare, and are becoming more valuable on this account.

Editor's Report, by Henry Kraemer. THE AMERICAN JOURNAL OF PHARMACY continues to embody to a greater or less extent the history of American Pharmacy as it has done since 1825; and during the past year papers of historical, professional and practical value have been secured.

Librarian's Report, by Thomas S. Wiegand. The library has been consulted much more during the past year than for a considerable time, both by the Classes and others; 301 bound volumes and 834 unbound volumes and pamphlets have been presented by the President.

Seventy-eight bound volumes and 76 pamphlets and unbound volumes have been received, and over 80 volumes of exchanges have been bound and added to the library.

Report of Committee on Pharmaceutical Meetings, by Richard V. Mattison, M.D. The meetings have been held regularly during the College year. The programs have been of both professional and practical interest. The attendance has been increased, and more interest manifested by retail pharmacists than heretofore, at least for some years back.

Curator's Report, by Joseph W. England. The Museum is in good condition and has received a number of additions during the year. The working collection of official drugs and preparations continues to be of undiminished interest and practical worth to the students in their daily work. A previous suggestion that the preparations of the National Formulary should be placed in the reading-room is renewed.

The resignation of Mr. L. S. A. Stedem was presented, and on motion accepted, when all the requirements had been complied with.

The various recommendations contained in the reports of the President, Committee on Pharmaceutical Meetings and Curator were then taken up, and on motion they were referred to the Board of Trustees. The following names of nominees for honorary membership made at the December meeting were then balloted for and unanimously elected: Prof. Chas. F. Chandler, Columbia University; Dr. Albert B. Prescott, University of Michigan; Dr. Fred B. Power, Scientific Laboratory of Burroughs, Wellcome & Co., London, Eng.

Delegates to the meeting of the Pennsylvania Pharmaceutical Association, at Buena Vista, June 24th–27th, were appointed: C. A. Weidemann, H. L. Stiles, Meiers Busch, Joseph W. England and Jacob M. Baer.

The annual election being next in order, Mr. William McIntyre and Mr. Jacob M. Baer were appointed tellers, who, after a ballot, reported the election of Howard B. French, President; William J. Jenks, First Vice-President; Richard V. Mattison, M.D., Second Vice-President; James T. Shinn, Treasurer; A. W. Miller, M.D., Corresponding Secretary; C. A. Weidemann, M.D., Recording Secretary; Joseph W. England, Curator; Thomas S. Wiegand, Librarian; Henry Kraemer, Editor.

Trustees for three years: Joseph P. Remington, T. Morris Perot and C. Carroll Meyer.

Publication Committee: Henry N. Rittenhouse, Samuel P. Sadtler, Wallace Procter, Henry Kraemer, Joseph W. England, Joseph P. Remington and R. V. Mattison, M.D.

Committee on Pharmaceutical Meetings: R. V. Mattison, M.D., Joseph P. Remington, Henry Kraemer, C. B. Lowe, M.D. and William L. Cliffe.

A recess was declared while the vote was being counted. Professor Remington alluded to the coming meeting of the American Pharmaceutical Association, which would be held at the Hotel Walton, Philadelphia, September 8th–15th. He stated that an exhibition would be arranged at Horticultural Hall, and urged the active co-operation of all the members and druggists generally, as the meeting promised to be one of the most instructive and interesting ever held. Dr. C. B. Lowe also urged the members to get to work in earnest.

C. A. WEIDEMANN, M.D.
Secretary